Coal Age

AUGUST, 1944

THE MINE BOSS IN MANAGEMENT

"WASH-OUTS" STOP... GREASE COSTS DROP

SUN MINE LUBRICANTS

Cut Grease Consumption 20% . . . Reduce Wheel Replacements

When mine cars must operate under bad water conditions, a difficult lubrication problem often results. In one such case, a high-grade, competitive grease used for car wheel bearings washed out quickly.

In spite of frequent regreasing, wheel replacements were too high. Lubrication and operating costs were excessive. Acting upon the advice of a Sun Lubrication Engineer, this mine tried Sun Mine Car Grease #9.

Bearing failures were cut to a minimum immediately and grease consumption was reduced far below the volume previously used. As a result, cost of lubrication tumbled 20%! Operating costs, too, were lowered.

That was 10 years ago . . . and every year since then competitive tests of other greases have been made . . . but not one has been able to equal the performance of the Sun Lubricant.

Sun Engineers have had wide experience in licking really tough mine lubrication problems. This experience, teamed up with the complete and proved line of Sun Mine Lubricants, is a combination that gets things done . . . the right way. Put a difficult lubrication situation up to a Sun Engineer and judge the results for yourself.

Be sure to get the new Sun Lubrication Manual, "How to Get the Most Out of Lubricants". It contains a lot of useful information. You may obtain a copy without cost or obligation by writing to . . .

SUN OIL COMPANY • Philadelphia 3, Pa.

Sponsors of the Sunoco News Voice of the Air—Lowell Thomas

SUNOCO **SUN INDUSTRIAL PRODUCTS**

HELPING INDUSTRY HELP AMERIC

Rubber fingers that pick up bags of sugar

A typical example of B. F. Goodrich development in rubber

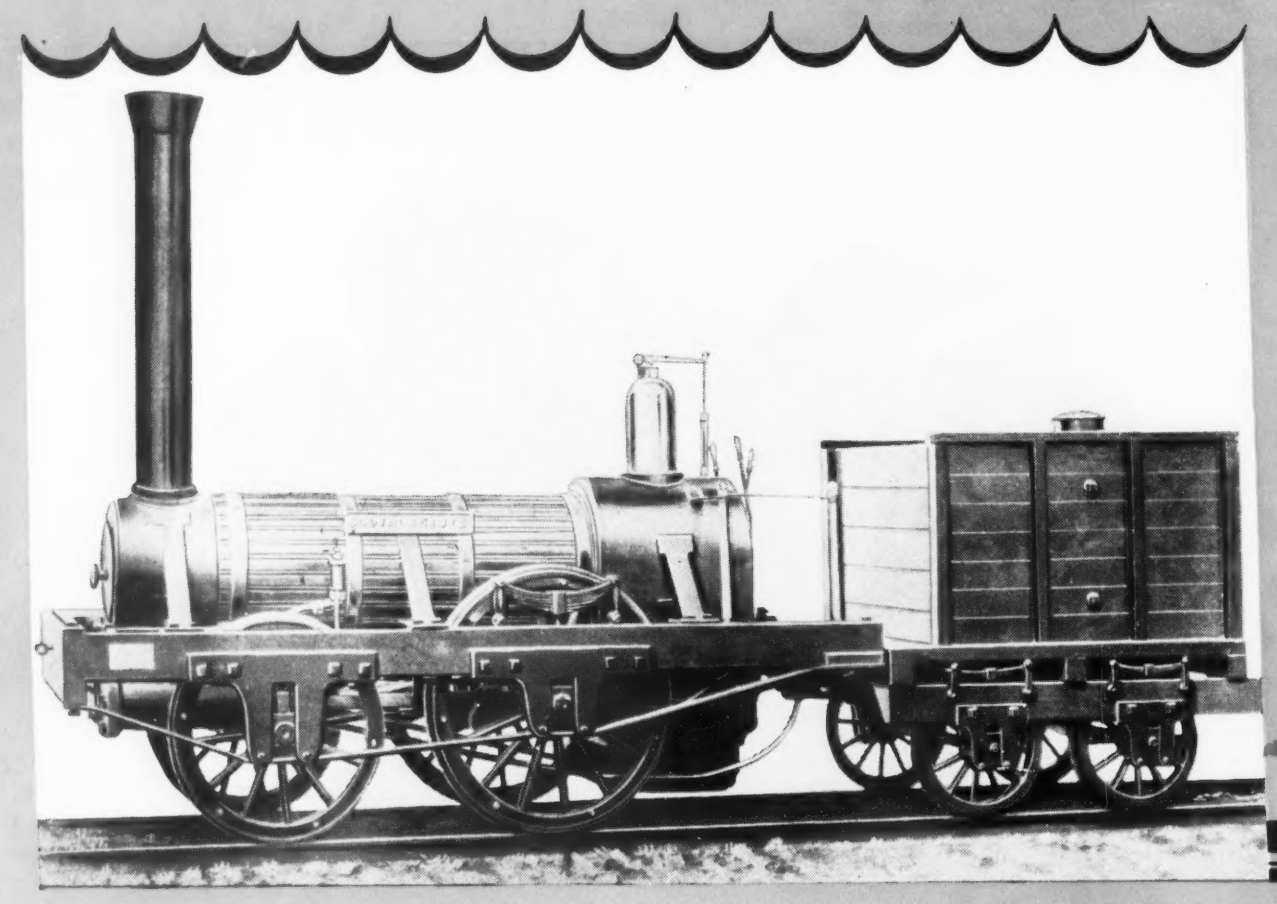
GETTING hundred pound sacks of sugar up a grade that looks like this ◿ was causing plenty of trouble in a Louisiana sugar mill. The bags could be trucked to within a few feet of the Mississippi river. But they had to be conveyed across a high levee to get to the wharf. The bags simply slipped off regular smooth-surfaced conveyor belts. Then wire mesh belts and belts with cleats across them were tried. But both the wire and the ridges tore the bags and spilled good sugar on the river bank. It looked as though the only remedy was to lengthen the conveyor to reduce the steepness of the slope — a costly and inefficient way of handling sugar.

Then B. F. Goodrich learned of the problem and suggested a belt of theirs made with 3000 tiny flexible "fingers" per square foot. This B. F. Goodrich development was originally designed to carry cartons up and down inclines in food plants. But it proved to be the answer for the sugar bags, gripping them firmly but gently. Tearing of bags became a thing of the past. That was five years ago and the original belt is still in service down on the levee.

B. F. Goodrich men often find that a product developed for one purpose will solve an entirely different problem. That's why they suggest you consult a B. F. Goodrich distributor or write the B. F. Goodrich Co. if you have a problem that might be solved with rubber — natural or synthetic. *The B. F. Goodrich Company, Industrial Products Division, Akron, O.*

B.F. Goodrich

RUBBER *and* SYNTHETIC *products*



TO DO ONE THING

IT is more than a century ago since Matthias W. Baldwin of Philadelphia built "Old Ironsides", his first locomotive. Today the quality of Baldwin locomotives is famous all over the world. A tribute to the genius of Baldwin.

A QUARTER of a century ago Hulburt of Philadelphia began making lubricating grease, solely for use on coal mining equipment. Today the quality of Hulburt Grease has made it famous throughout the coal industry.

HULBURT OIL & GREASE COMPANY · · · PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

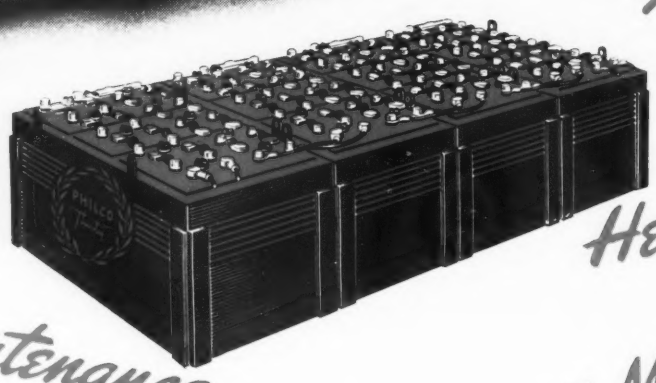
.....and do it supremely well!

HULBURT *Quality* GREASE

Just Announced!

REVOLUTIONARY NEW "PHILCO THIRTY" GIVES 30% LONGER LIFE!

Less Depreciation



More Work

Lower Maintenance

Greater Economy

Heavier Loads

10% More Capacity

Again . . . Philco Makes Engineering History

At last, a mine locomotive and shuttle car battery with a revolutionary, new construction that actually gives you *30% longer life . . . and more!* A brand new principle of fabricated insulation developed after years of research in the Philco laboratories, and now introduced after exhaustive tests in actual service. It's the *Philco "Thirty"* . . . your post-war battery, available now in certain types and limited quantities. Write today for full information.

PHILCO CORPORATION, ***Storage Battery Division, Trenton 7, New Jersey***

FOR 50 YEARS A LEADER IN MINE STORAGE BATTERY DEVELOPMENT

Coal Age

IVAN A. GIVEN, *Editor*

R. Dawson Hall — J. H. Edwards
Louis C. McCarthy — Fred W. Richart
James R. Sutphen — R. R. Richart
Maj. Charles H. Lambur, Jr. *(on leave)*
Paul Wooton

ALFRED M. STAEHLE, *Publisher*

A McGRAW-HILL PUBLICATION

COAL AGE (with which is consolidated "The Colliery Engineer" and "Mines and Minerals") is published monthly on the 1st. Allow at least ten days for change of address.

Subscription rates: United States, Mexico, Central and South America, $3 for one year, $4 for two years, $5 for three years. Canada, $3.00 for one year, $5 for two years, $6 for three years. Great Britain and British Possessions, 30 shillings for one year, 60 shillings for three years. All other countries, $5 for one year, $10 for three years. Single copies, 35 cents each. Entered as second-class matter Oct. 14, 1936, at the Post Office at Albany, N. Y., under the Act of March 3, 1879. Printed in the U. S. A., Cable Address: "McGraw-Hill, N. Y." Member A.B.P. Member A.B.C.

•

Return Postage Guaranteed

Contents Copyright 1944 by McGraw-Hill Publishing Co., Inc.

JAMES H. McGRAW
Founder and Honorary Chairman

JAMES H. McGRAW, JR.
President

HOWARD EHRLICH
Executive Vice President for Business Operations

JOHN ABBINK
Executive Vice President for Editorial Operations

CURTIS W. McGRAW
Vice President and Treasurer

JOSEPH A. GERARDI, Secretary

J. E. BLACKBURN, JR.
Director of Circulation

Publication office, 99-129 North Broadway, Albany, 1, N. Y. Editorial and executive offices, 330 West 42d St., New York, 18, N. Y. Branch offices: 520 North Michigan Ave., Chicago, 11; 68 Post St., San Francisco, 4; Aldwych House, Aldwych, London, W.C. 2; Washington, 4; Philadelphia, 2; Cleveland, 15; Detroit, 2; St. Louis, 1; Boston, 16; Atlanta, 3; Los Angeles, 14; Pittsburgh, 738-9 Oliver Building.

All communications about subscriptions should be addressed to the Director of Circulation, Coal Age, 330 West 42d Street, New York, 18, N. Y.

District Managers: T. E. Alcorn and F. W. Roets, New York; J. F. Cleary and W. A. Potter, Philadelphia; W. M. Spears, Cleveland; W. S. Drake, Detroit; S. J. Alling, Chicago; R. Y. Fuller, St. Louis.

CONTENTS

Volume 49 — **AUGUST, 1944** — *Number 8*

The Mine Boss: Vital Factor in Management 76

Single Shuttle Cars Handle 300 Tons per Shift From Loaders .. 82
By RALPH R. RICHART

Mechanical Maintenance Facilitated by Old Ben Central Shop . 87

Industry Presses "Coal for Victory" Drive
Insert Between pp. 90 and 91

Deepwell Pumps Unwater Bast Mine From Surface Station 91

Safety Crew Eliminates Hazards and Proves Sincerity 94
By ROBERT DICKSON

Good Roads Essential in Strip-Mine Truck Haulage 96
By FRED W. RICHART

Roof Control in Haulways and Airways by Guniting 100
By JAMES HYSLOP

Drill Press Powers Pump Tester 112

Special Tool Kit Handles Pulling Jobs 112

Detergent Facilitates Cleaning Rags 114

Banding Restores Worn Hoist Drums 114

Dog Keeps Cars in Rotary Dump 116

Special Puller Pulls Drill Armature 116

Asbestos Ring Protects Cable Reel 118

Slate Dumped by Shovel in Building Wireless Yard 118

Editorials 75

Foremen's Forum ..... 104 — **Questions and Answers** ... 108

News From the Field ..... 121 — **Tips From Manufacturers** . 167

CHANGE OF ADDRESS

McGRAW-HILL PUBLISHING COMPANY
330 West 42d Street, New York 18, N. Y.

Director of Circulation:
Please change my address on COAL AGE

FROM .....

To .....

SIGNED .....

WALWORTH BRONZE VALVES

No. 225P GLOBE, 500 Brinell Seat and Disc

No. 448PF GLOBE, Marine Service Valve.

No. 95 GLOBE, Re-new Disc

No. 420 SWING CHECK, Regrinding Valve

No. 256 GLOBE, A.A.R. Locomotive Valve

No. 328 GLOBE, with Walseal Ends 3000 lb. O.W.G.

No. 29 GATE, Double Disc-Taper Seat

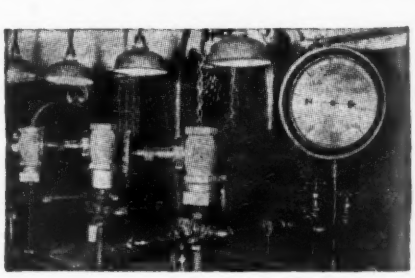
No. 11 GATE, One-Piece Wedge

No. 1736 BRONZE, Lubricated Plug Valve

Walworth's *complete line* of bronze valves, a number of which are illustrated above, includes types designed to fit every service where bronze valves are required. Strict laboratory supervision of the physical, chemical, and metallurgical properties of the materials entering into all Walworth products is supplemented by continuous inspection of the manufacturing operations, both as to accuracy and quality of finish, and by rigid final inspection and testing of each individual product.

Walworth manufactures a complete line of valves and fittings in steel and iron, as well as bronze. Cast iron pipe and three types of pipe wrenches are also made. For full details on Walworth products write, on your company letterhead, for a free copy of Walworth Catalog 42.

Testing Seats of Bronze Valves



Assembled bronze valves are subjected to test under pressure—either air-under-water, steam or hydraulic. The hydraulic seat test is shown here. Walworth Quality Bronze Valves undergo a hydrostatic shell test of three times their rated working steam pressures.

BOSTON WORKS
KEWANEE WORKS

WALWORTH
valves AND fittings
60 EAST 42nd ST., NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Coalmaster Drilling Tools are provided with Coalmaster Hexanspeed auger couplings and patented Hexagon Shanks and Sockets. They are foolproof and protect even inexperienced workers from injuries. What's more: they save time and do away with the old cotter-pin and hammer-and-nail method.

The augers are merely pressed together to couple automatically. To uncouple — only a simple hand tool is needed.

Hexanspeed couplings reduce auger changing time and speed up your production 10-30%.

Our engineers will be glad to give you detailed information.

DRILLING
COALMASTER
TOOLS

CENTRAL MINE EQUIPMENT CO.
ST. LOUIS 8, MO.

HERE'S WHY WE SAY: Allis-Chalmers are Unbiased...

CRUSHERS	Jaw Crushers	Superior Type All-Steel Blake Type "B" Blake All-Steel Fine Reduction Dodge
	Gyratory Crushers	Superior Type Type "R" Reduction Newhouse
	Roll Crushers	Double Crushing Rolls Fairmount Single Roll
	Hammer Crushers	Pulverators (Impact Type)
WASHING & DISINTE-GRATING	Screens	Revolving—Heavy Duty Rotary Scrubber Wet Vibrating Screens with or without Scrubber Pockets
	Blade Mills	Up to 12" Feed
	Revolving Scrubbers	Up to 6" Feed
	Log Washers	Up to 3½" Feed
	Screw Washers	Up to ½" Feed
	Slug Mills	Grind Out Soft Materials
HYDRO-METAL-LURGICAL EQUIPMENT	Concentration	Classifiers Jigs Filters Agitators
	Cyanidation	Distributors Tanks Classifiers Agitators Filters

ALLIS-CHALMERS

of Basic Processing Equipment — Recommend

Recommendations

A GLANCE AT THE "BREAKDOWN" below gives you a rough idea of the broad range of equipment A-C builds for coal producers and distributors. This "breakdown" is not complete, for A-C builds over 1600 *different* products — many of them widely used in this industry.

The significant fact is that A-C builds *all types* of basic processing equipment . . . many different styles and sizes. When you need a screen, for example, selection can be made—not from one—but *four different* styles. This means you get the *exact* equipment for your application. Yes, A-C recommendations *are* unbiased . . . because they're based on the job to be done—not an improvised way of doing it!

Next time *you* have a processing problem call on A-C. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 1739-C

POWER & ELECTRICAL	Power Plants	Turbines & Condensers Generators Boiler Feed & Condenser Pumps
	Distribution & Control	Transformers Voltage Regulators Unit Substations Switchgear Circuit Breakers Switchboards & Control
	ac/dc Conversion	Motor-Generator Sets Synchronous Converters Mercury Arc Rectifiers
MOTORS & CONTROL	Lo-Maintenance Motors	Squirrel Cage Wound Rotor Synchronous Direct Current
	Large Motors	A-C & D-C to 5,000 hp with Control
	Gearmotors	All-Motor or Integral—for Machine Mounting
	Motor Controls	Open or Enclosed Starters Combination Starters
TEXROPE V-BELT DRIVE PRODUCTS	Sheaves	Constant Speed Variable Speed
	Speed-Changer Units	Manual or Motor-Operated
	V-Belts	Heat-Resisting Super-7 Oil-Resisting Super-7 Oil-Proof Super-7 Static-Resisting Super-7 Super-7-Steel

BUILDS ALL TYPES

the Exact Type Suited to Your Particular Needs!

THE GEAR . . . THAT STOPPED PROD

This little pinion gear, just a small part in the mechanism of a coal cutter, actually halted production at a coal mine by breaking down on the job. This single gear kept a full crew of miners idle for an entire shift and effectually reduced the day's tonnage. And all this happened because the mine superintendent "saved" a few pennies by not using genuine replacement parts.

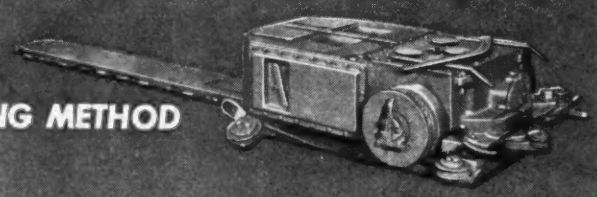
The costs of such production losses can never be fully recovered, yet mine superintendents who do not insist upon genuine replacement parts run the risk of such losses every day.

Sullivan coal cutter parts are the only genuine replacement parts for Sullivan coal cutters. They are designed and built to insure uninterrupted production and continued satisfactory service. When your Sullivan coal cutters need replacement parts, insist on Sullivan parts.

Sullivan Machinery Company, Executive Offices: Michigan City, Indiana. Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario.

SULLIVAN

MODERN MACHINES FOR EVERY MINING METHOD

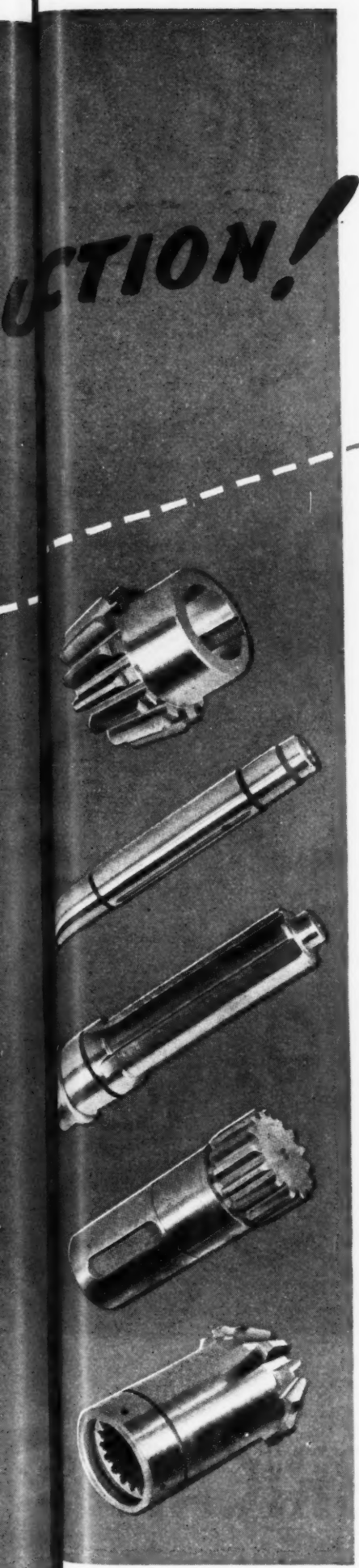


COAL MINING MACHINES • SCRAPER HAULERS • ROCK LOADERS • HOISTS • CAR PULLERS • AIR COMPRESSORS • COAL DRILLS • ROCK DRILLS • CUTTER BIT SHARPENERS AND HEATERS • CORE DRILLS AND CONTRACT CORE DRILLING.

SALES OFFICES IN

*BIRMINGHAM	*DENVER	*MIDDLESBORO	SAN FRANCISCO
*BUTTE	*EL PASO	NEW YORK	SALT LAKE CITY
CHICAGO	*HUNTINGTON	*PITTSBURGH	*SCRANTON
*DALLAS	KNOXVILLE	SEATTLE	*ST. LOUIS

*Warehouse facilities at these offices.



WHY YOU SHOULD INSIST ON GENUINE SULLIVAN COAL CUTTER REPLACEMENT PARTS

Engineering

Sullivan coal cutter parts are designed by the same engineers who design Sullivan coal cutters. They know the severe service to which these parts are subjected and design them accordingly.

Metallurgy

The raw materials from which Sullivan coal cutter parts are manufactured are thoroughly tested by the Metallurgical Division. Chemical analysis, microscopic analysis and heat-treating tests are being made continually to make certain only the best materials available are used.

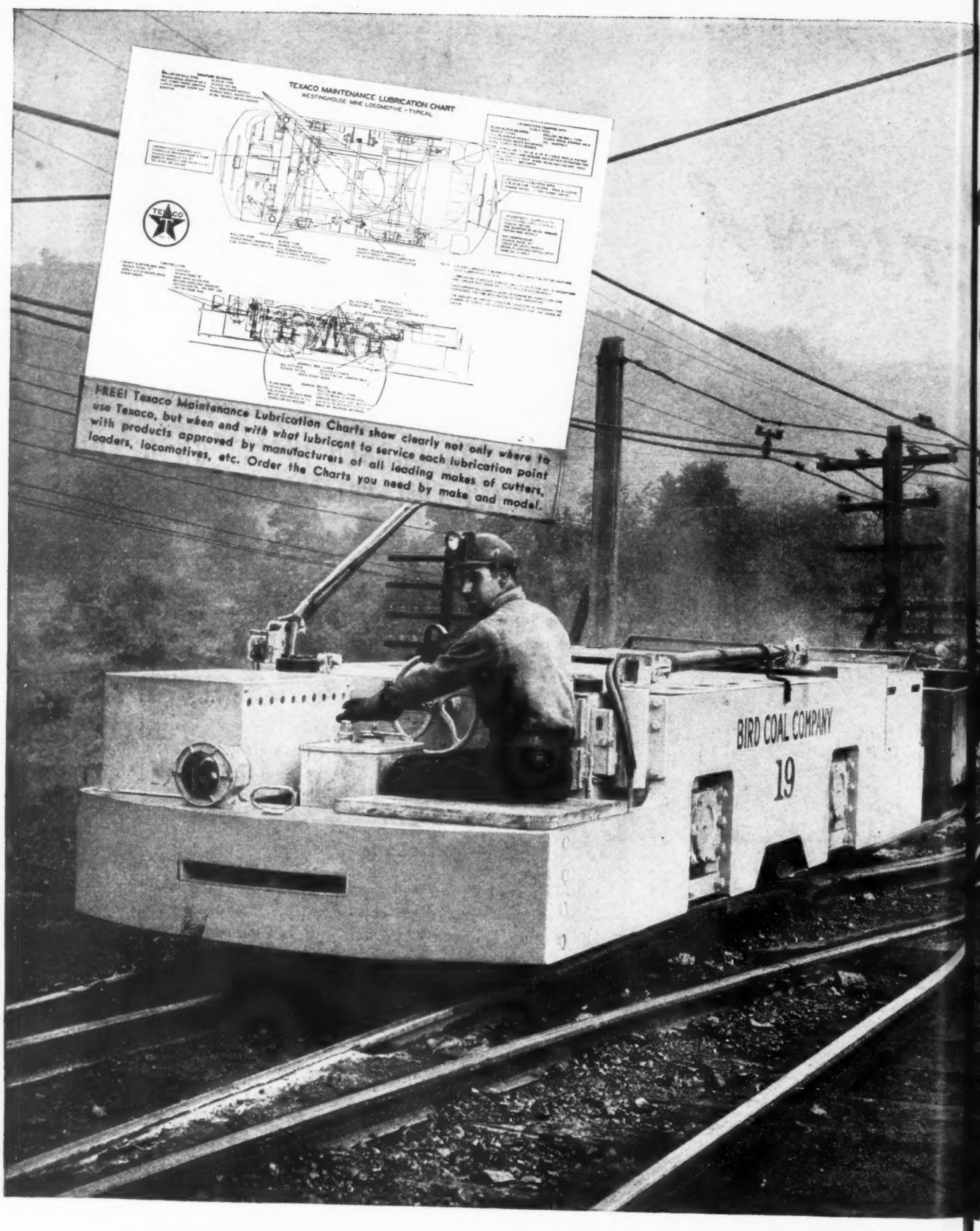
Manufacture

Sullivan coal cutter parts are built to the same standard as Sullivan coal cutters. Every operation in the manufacture of these parts is completely checked and each part is inspected before shipment.

Warehouse

Sullivan warehouses, conveniently located in all the principal coal fields, carry a full stock of replacement parts at all times. By ordering direct from the nearest warehouse, you can eliminate long, costly delays.

Only by taking advantage of these resources, and only by insisting upon genuine Sullivan coal cutter parts can you be certain of keeping your Sullivan coal cutters performing at the same high standards of efficiency for which the machines are designed and built.



FREE! Texaco Maintenance Lubrication Charts show clearly not only where to use Texaco, but when and with what lubricant to service each lubrication point with products approved by manufacturers of all leading makes of cutters, loaders, locomotives, etc. Order the Charts you need by make and model.

TEXACO
REG. T. M.

TEXACO LUBRICANTS fo

Right of Way

FOR MORE TONNAGE

MORE COAL! Wartime demands for increased tonnage from the nation's mines are terrific, and every piece of mine machinery must do extra duty.

Operators know they can count on increased production and longer life from mechanized equipment when it is properly lubricated . . . and *effective* lubrication is assured with TEXACO.

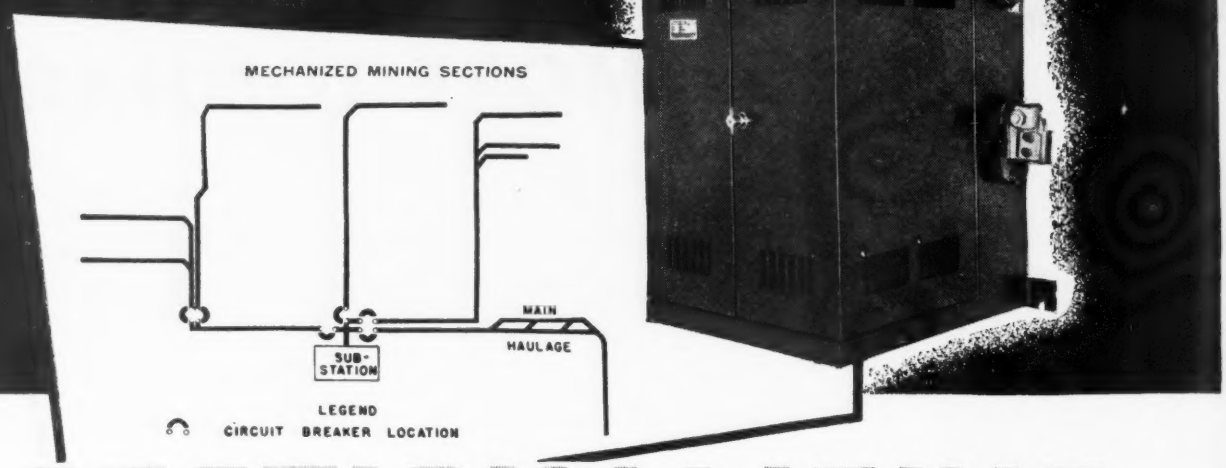
Texaco Regal Starfak, for example, provides effective lubrication over a wide range of temperature conditions for grease-lubricated ball and roller bearings of electric motors used in locomotives, cutters, loaders, shuttlecars, etc. *Regal Starfak* resists separation, leakage, oxidation, therefore makes bearings last longer.

Texaco lubricants are approved by all leading makers of mechanized equipment, who have cooperated with us in producing Texaco Maintenance Lubrication Charts.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distribution points in the 48 States. The Texas Company, *National Sales Division, Dept. C,* 135 East 42nd Street, New York 17, N. Y.

IT For the Coal Mining Industry

Better than 10% increase in tonnage results from . . .



SECTIONALIZING

with Automatic Reclosing Circuit Breakers

Increase in tonnage is the common experience of mechanized mines in which d-c electrical systems are sectionalized. Ten percent is a fair average based on installations over a fifteen-year period. Such increase is vital in the industry's effort to surpass all previous production totals.

Sectionalizing raises production by improving continuity in the use of motorized equipment. The more mechanized a mine is, the greater the possibility for electrical disturbances. Whenever they occur in a sectionalized mine, disturbances are confined to the areas in which they arise and service is resumed at the earliest moment. Other areas, which without sectionalizing would be penalized, are not affected.

In the simplified mine sketch, shown above, each area fed from the substation has its automatic reclosing circuit breaker. This arrangement is the first step toward an ideal sectionalized system.

I-T-E engineers can help you reach the ideal. They have had by far the industry's widest experience in planning sectionalized systems. They are always available to help you.

Representatives in Principal Mining Areas

I-T-E

AIR SWITCHGEAR

IMMERSED IN AIR — ENCASED IN STEEL

The Army-Navy "E" for Production Excellence

CIRCUIT BREAKER CO., PHILADELPHIA 30, PA.

Euclid Wagon equipped with
GOODYEAR HARD ROCK LUGS,
used in Minnesota strip mine

THERE'S A GOODYEAR FOR EVERY JOB

For mud and marsh *specify* Goodyear Sure-Grip

For drawn dirt movers—*specify* Goodyear All-Weather Earth-Mover

YEARS of experience prove this husky Goodyear Hard Rock Lug tire is in a class by itself for all heavy hauling where tires are exposed to cutting, snagging and bruising.

That's because it is specially designed for rock work. It is armored with massive, wide-based lugs that provide sure-footed, non-slip traction — and extend deep down over the sidewalls to protect all parts of the tire from cuts.

It's a universal, two-way tread—no rights and lefts —with the same powerful grip in reverse as forward. It's a self-cleaning tread, with straight, wide, V-shaped grooves open at the ends — so pitched that dirt and stones are forced out as the tire revolves. It won't trap and hold stones!

Add to this the rugged strength of its low stretch Supertwist cord carcass, its heavy beads that insure firm seating and you get a tire that laughs at the tough jobs. You don't have to take our word for that. The fact that Goodyear Hard Rock Lugs are first choice where the going is toughest proves it.

BUY WAR BONDS — BUY FOR KEEPS

Supertwist, Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company

GOODYEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

From Grass Roots t

14881

with DUCKBILL S

Duckbill

GOODMAN MANUFACTURING COMPAN

ts to Full Production

31948

L SHAKER CONVEYORS

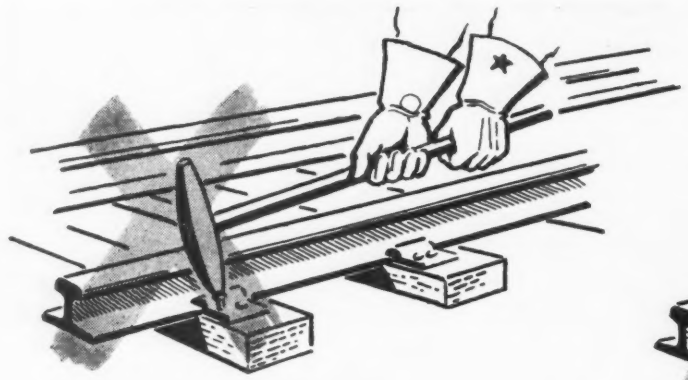
DEVELOPMENT . . . . . *drive main entries;* waste deposited at any desirable place for fill and grade.

SEMI-PRODUCTION . . . *drive room entries;* rapid advance, work done at a profit

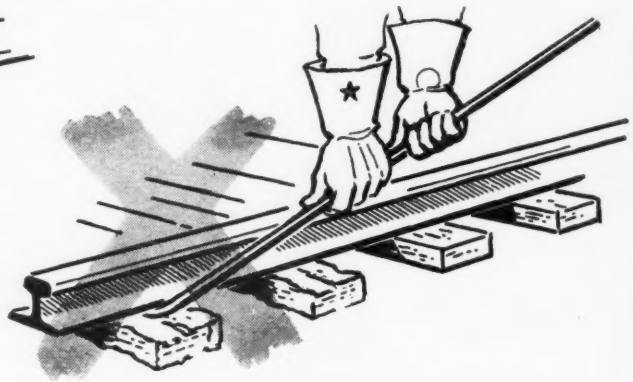
FULL PRODUCTION . . . *drive rooms;* high tonnage, continuous flow of coal from face to entry.

N HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

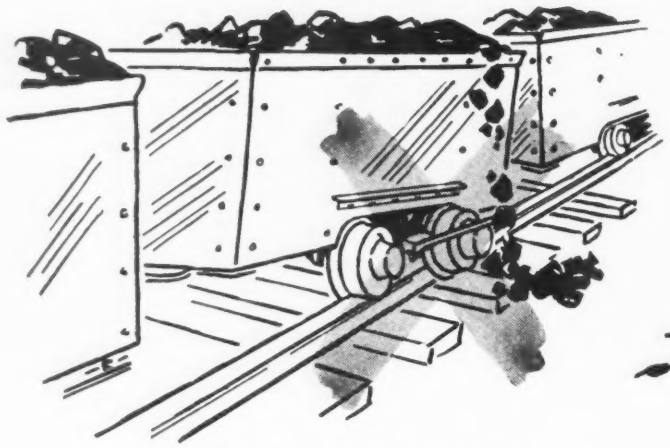
How Preformed Trackwork Saves



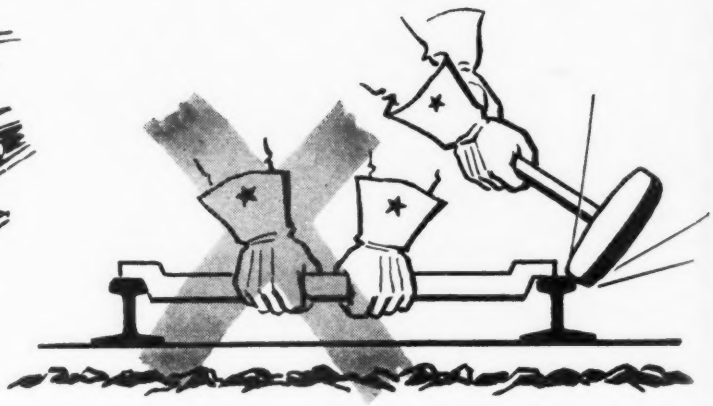
It halves laying time



It reduces track maintenance



It cuts down derailments



It releases men for other work

If you were planning to build a house, you'd probably employ a competent architect. He'd save money by specifying the proper materials. He'd recommend a design that would best suit the dimensions, shape, and physical features of your lot.

Bethlehem mine-track engineers render a similar service when you order Bethlehem preformed trackwork. They calculate and plan even the minor details of the proposed layout; recommend weights of ties, lengths of switches, turnout angles, etc.—all with an eye to the greatest economy in the long run.

Then, when details are settled, the track is cut, bent, and prefabricated in Bethlehem shops, where expert supervision and complete equipment are available. It comes to you ready for laying—fabricated to the greatest possible extent. Preformed turnouts are supplied with both curved and straight stock rails and closure rails; with switch stands, ties, special joints, frogs, and everything else that is necessary for a complete, easily assembled layout.

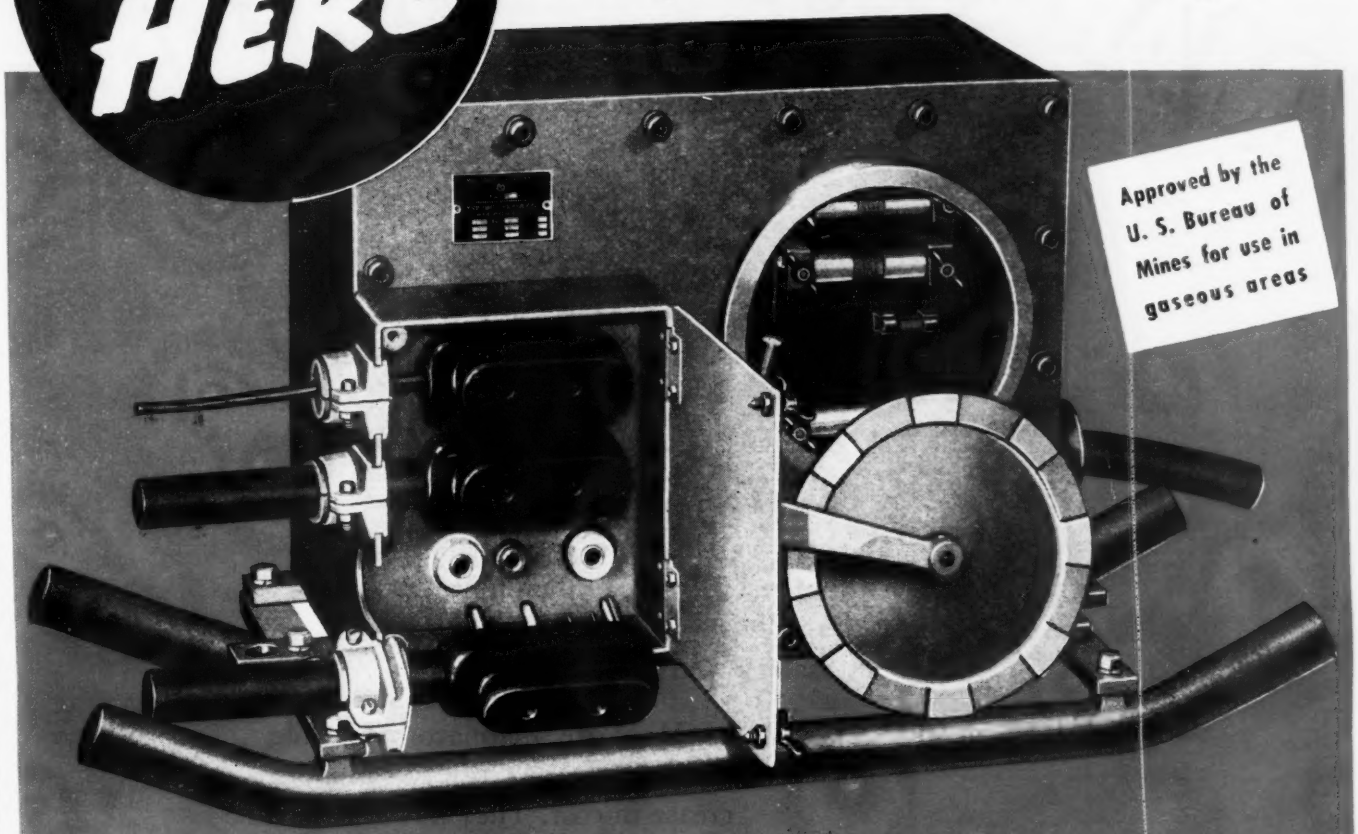
During this critical war period, no mine can afford lost hours due to excessive laying time, slow haulage, derailments, and extra maintenance. A great many of these time-consuming troubles can be eliminated by changing from "home-made" layouts to Bethlehem prefabricated trackwork.

Some of the country's best-known coal mines have already proved the soundness of this plan. They have shown, furthermore, that it results in outstanding economies. If you haven't already investigated, a Bethlehem engineer will be glad to talk over details.

★ ★ BETHLEHEM STEEL ★ ★

IT'S HERE

A Time-Saving, Production-Boosting Means of Connecting Multiple Face Circuits Underground



The O-B Type LG Gas-Proof Distribution Box...

Save Time

Connections made quickly. Light weight speeds movement as face advances.

Protect { Workmen / Tonnage }

Safe, fool-proof operation. Interlocked switch prevents connections or fuse renewals with power "on".

Conserve Cables

One-third as much multiple cable required to handle three face circuits. Machine cables fuse-protected against burnout.

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

2510-M

CLIP THIS COUPON AND MAIL TODAY

Ohio Brass Company • Mansfield, Ohio

Yes, I'd like to have more information on the new O-B Type LG Gas-Proof Multiple Distribution Box. Please send complete details and cataloging information to:

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

BUY INVASION WAR BONDS!

ATLAS MANASITE DETONATORS

Have You Taken This Step to EXTRA SAFETY?

In these wartime days, when labor is often green, it is doubly important to take every step that leads to greater safety and reducing risks.

Atlas Manasite detonators provide an extra factor of safety—at no increase in cost. They have been made to withstand more friction, more impact—and they are reliable in action. They have been used in ever-increasing numbers since they were first introduced five years ago.

Take this extra step to safety —now. Your Atlas representative will be glad to tell you all about Atlas Manasite detonators.

Manasite: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

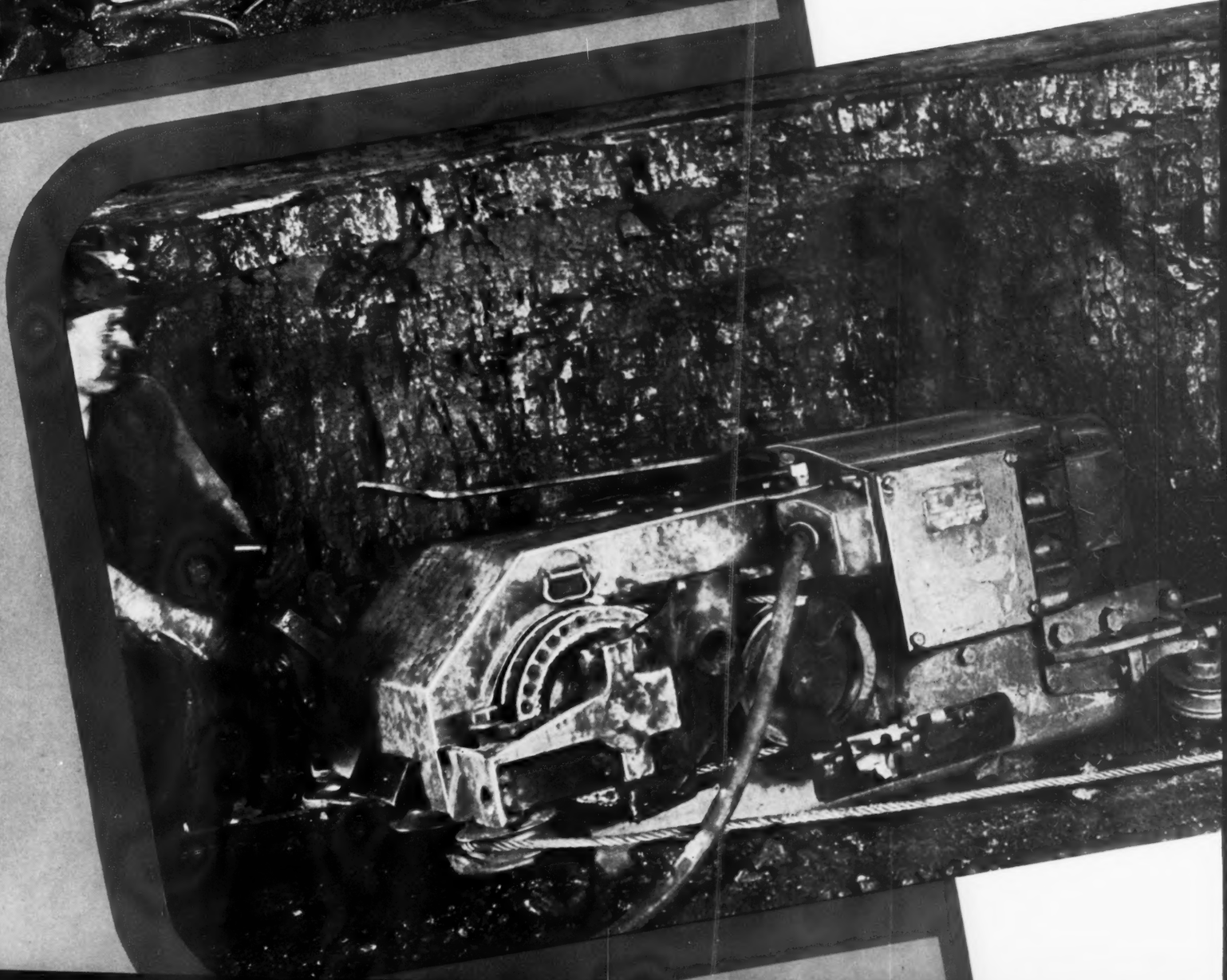
JEFFREY P

• Progress in mechanic
by comparison of these

From the early air type
35-B shortwall cutter ill
of development in the
Jeffrey mine equipme
mine requirements.

Jeffrey Engineers hav
mechanical mining—
practical, heavy dut
cutters to meet all
veyor-type mines to
mines.

Consult a Jeffrey En



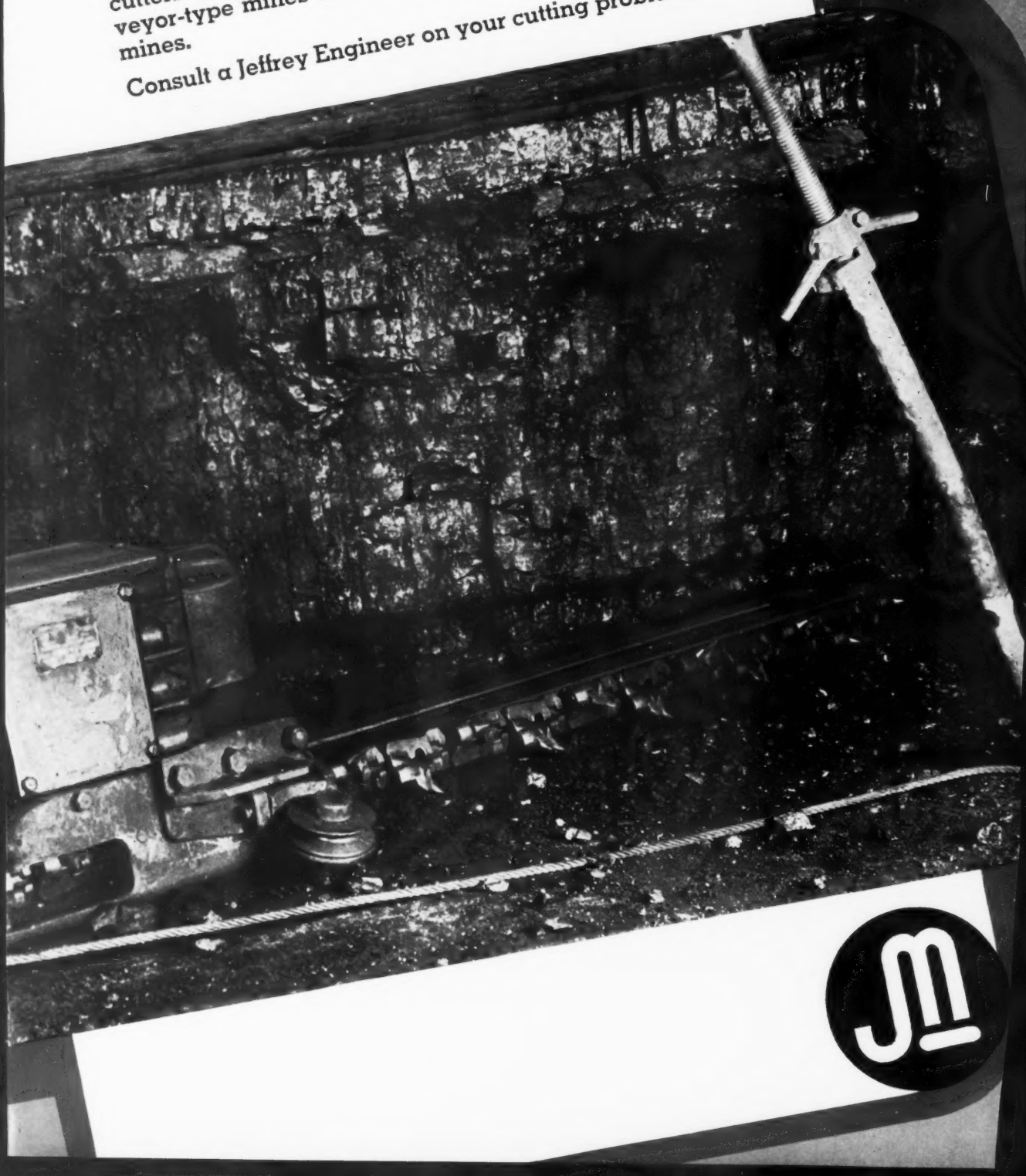
JEFFREY PROGRESS

• Progress in mechanical coal cutting is pictured by comparison of these Jeffrey Cutting Machines.

From the early air type Jeffrey cutters to the modern 35-B shortwall cutter illustrated below marks an era of development in the design and development of Jeffrey mine equipment to meet present-day coal mine requirements.

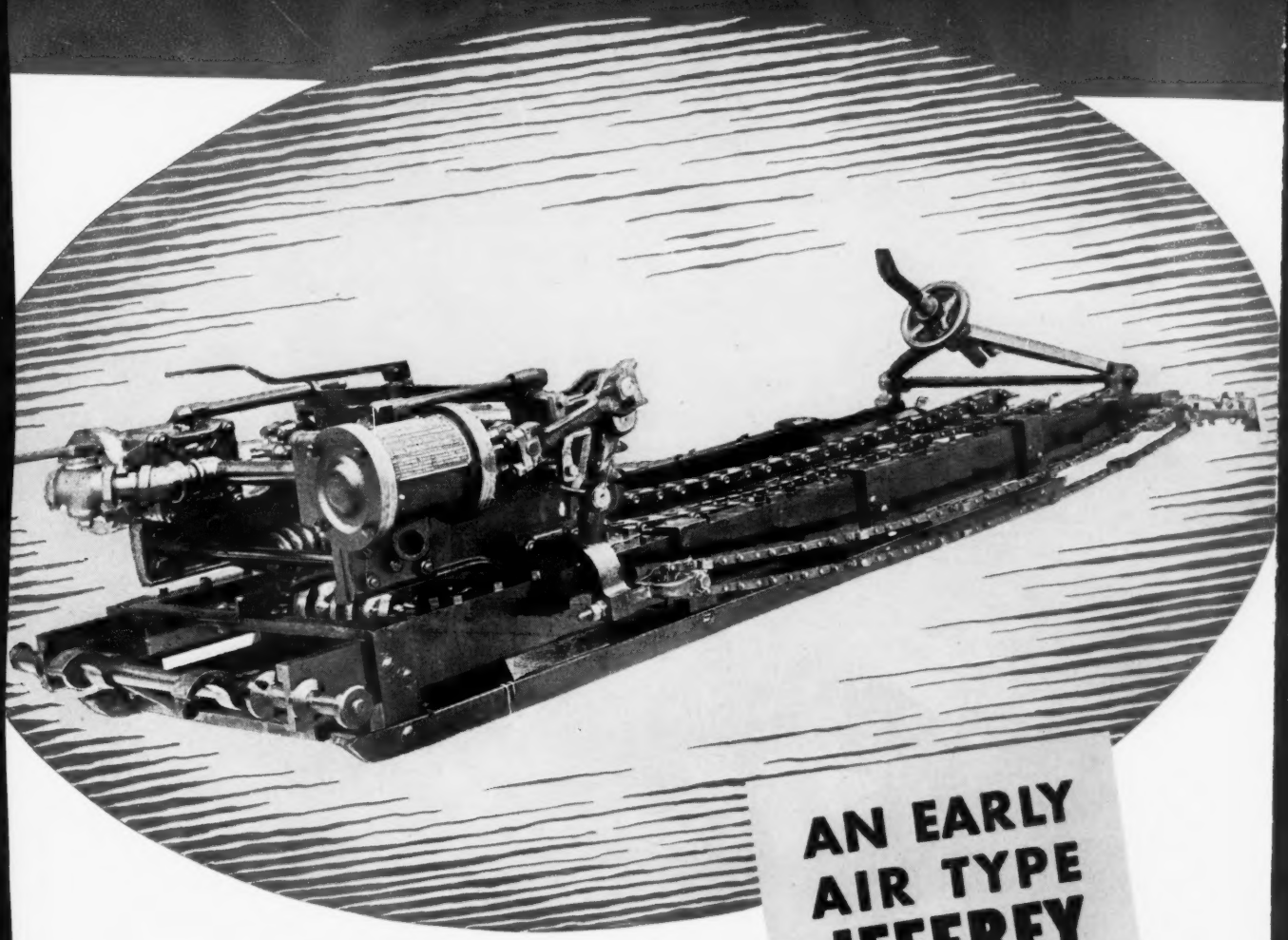
Jeffrey Engineers have kept abreast of the needs of mechanical mining—have met these needs with practical, heavy duty machines. Jeffrey builds coal cutters to meet all conditions — from the low conveyor-type mines to the high seam machine-loaded mines.

Consult a Jeffrey Engineer on your cutting problems.



JEFFREY

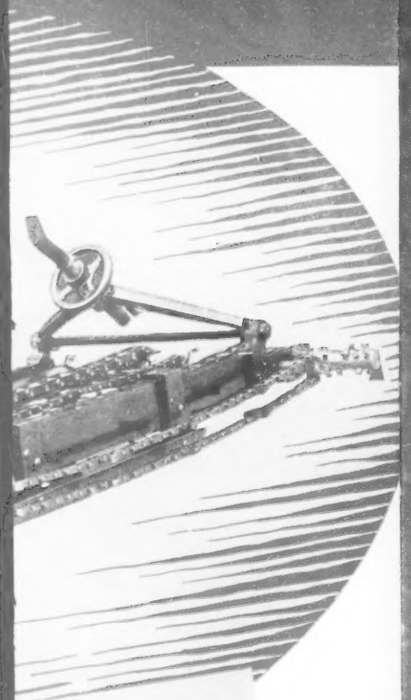
Mechanical Mine Equipment Since 1880



AN EARLY AIR TYPE JEFFREY CUTTING MACHINE

BUY WAR BONDS

EY
ce 1880



N EARLY
IR TYPE
EFFREY
UTTING
MACHINE

ONDS

Jeffrey

SERVES THE INDUSTRY
BELOW AND ABOVE GROUND
FROM FACE TO RAILROAD CAR

CUTTERS
DRILLS
LOADERS
LOCOMOTIVES
FANS
CONVEYORS
BLOWERS
JIGS
CRUSHERS
SCREENS
RENEWAL PARTS

THE JEFFREY MANUFACTURING COMPANY

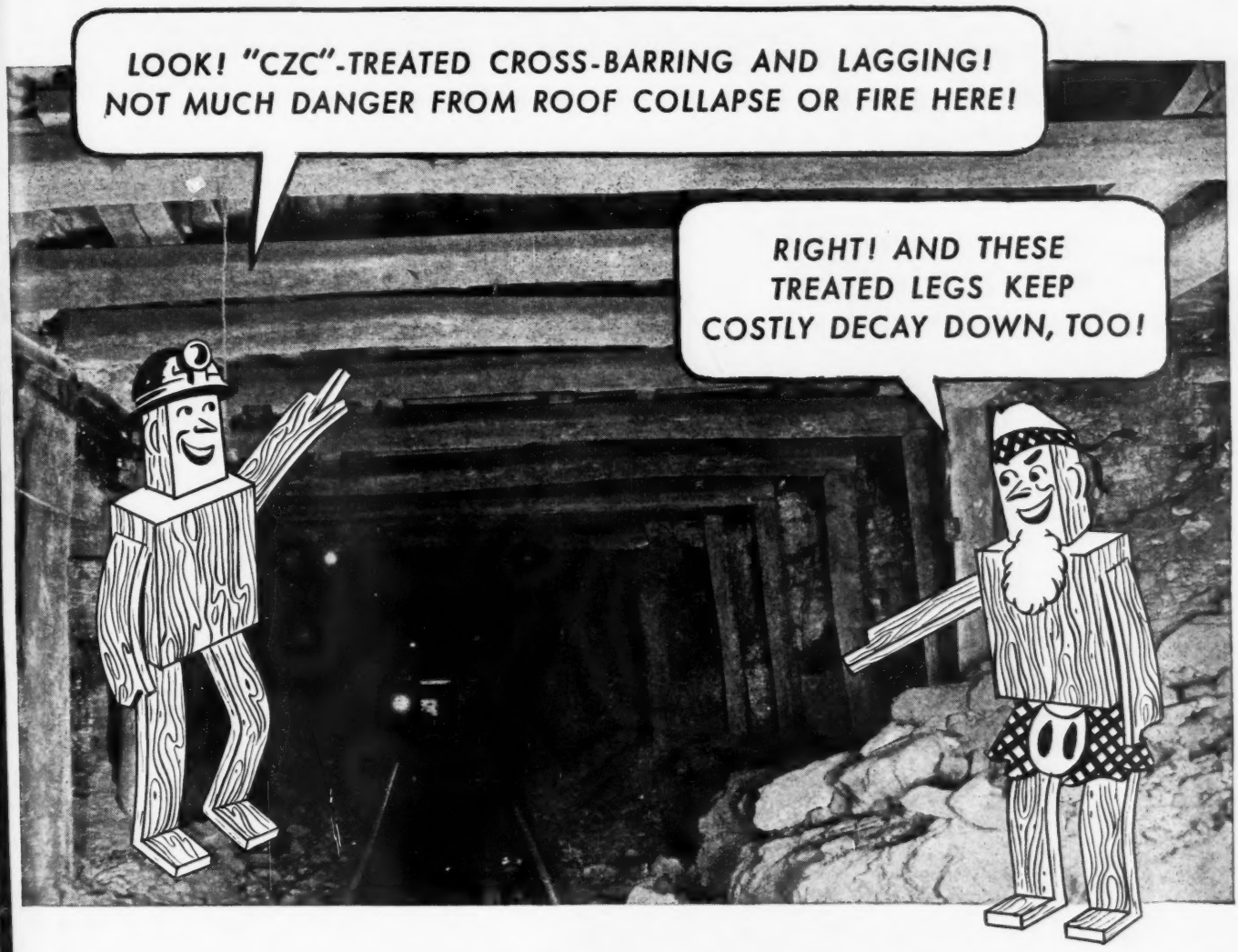
Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices: Baltimore, Birmingham, Boston, Buffalo, Chicago, Cleveland, Cincinnati, Detroit, Denver, Harlan, Houston, Huntington, Milwaukee, New York, Philadelphia, Pittsburgh, Scranton, St. Louis, Salt Lake C

Service Stations: Pittsburgh, Harlan, Ky., Birmingham, St. Louis, Logan-Beckley, W. Va., Scranto

Foreign Plants: Jeffrey Mfg. Co., Ltd., Montreal, Quebec; British Jeffrey-Diamond, Ltd., Wakefield, England; Jeffrey-Galion (Pty), L Johannesburg, S. A.


LOOK! "CZC"-TREATED CROSS-BARRING AND LAGGING! NOT MUCH DANGER FROM ROOF COLLAPSE OR FIRE HERE!
RIGHT! AND THESE TREATED LEGS KEEP COSTLY DECAY DOWN, TOO!

MINE FIRES are less likely to happen when timbers and ties are treated with Du Pont Chromated Zinc Chloride. And there is less chance of accidents resulting from decay-weakened timbers. These are two important reasons why mine men everywhere are insisting upon "CZC"-treated ties and timbers.

You can cut maintenance costs—eliminate early and frequent replacements with "CZC"-treated ties and timbers. Get *all* the facts on wood preservation for mines. Write E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Delaware.

DU PONT CZC

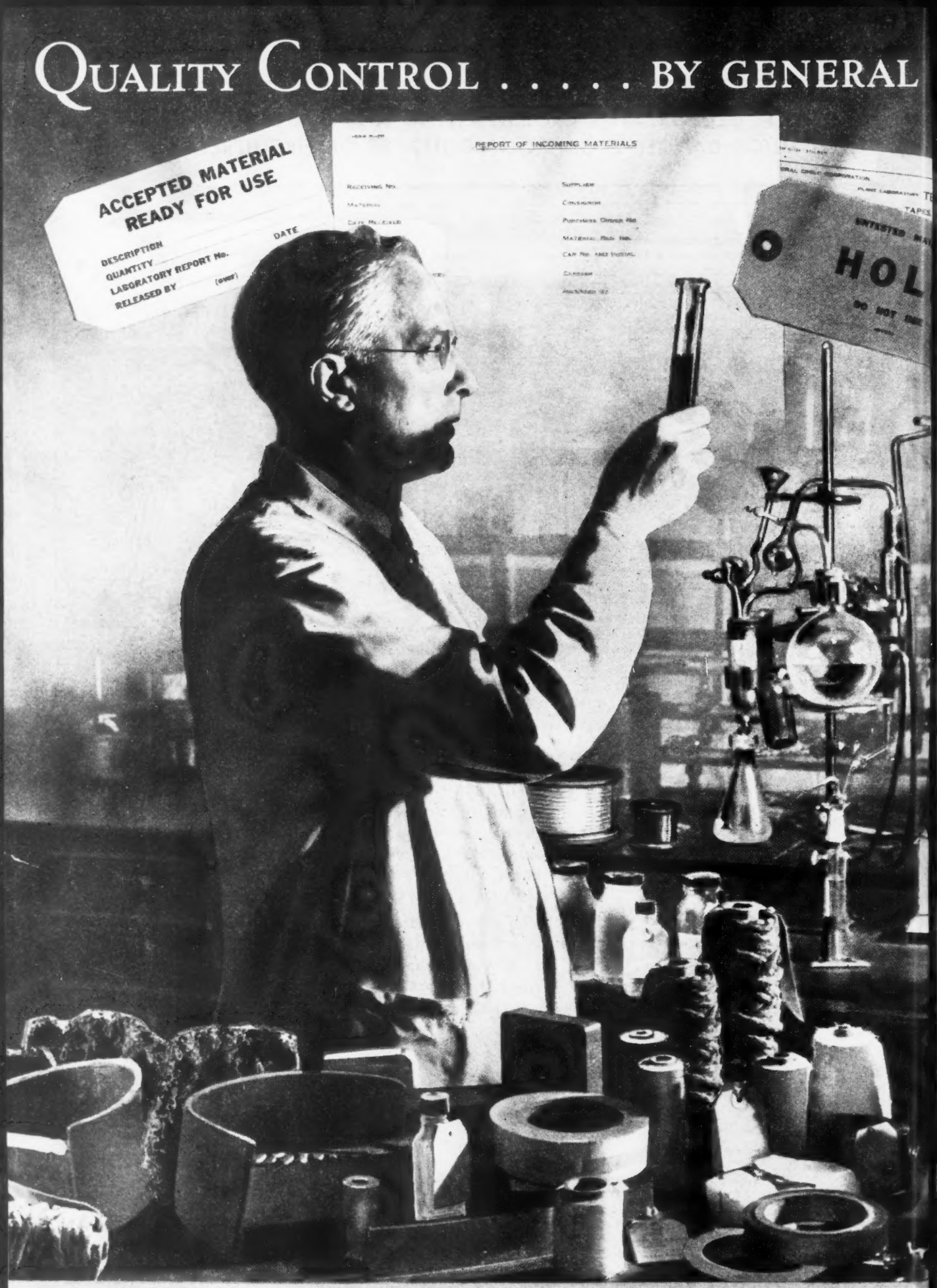
(CHROMATED ZINC CHLORIDE)

WOOD PRESERVATIVE

DU PONT
REG. U. S. PAT. OFF.

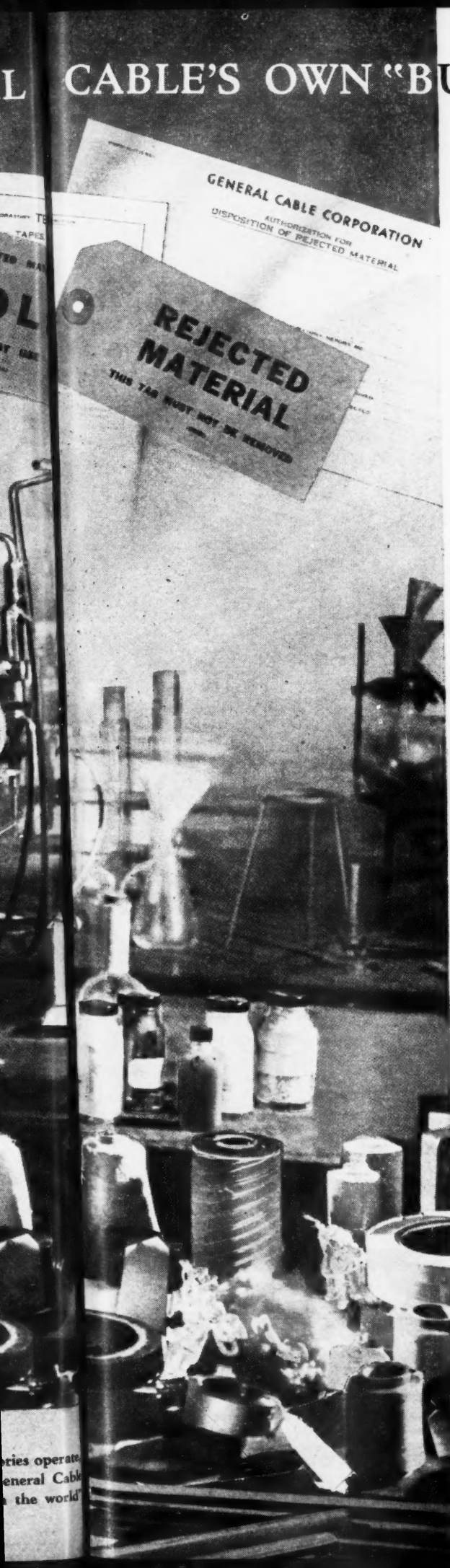
BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

QUALITY CONTROL . . . . . BY GENERAL



Literally hundreds of materials—among them metals, fabrics, lacquers, asphalts, synthetic polymers—are used in making modern wire and cable. The chemical, physical, metallurgical tests of all incoming raw materials for each plant are "double-checked" in the Control Testing Laboratory located at that plant. All 9 of these laboratories operate however, under direct and close supervision of the General Cable Research Laboratory—the largest, it has been said, "in the world" devoted exclusively to wire and cable research.

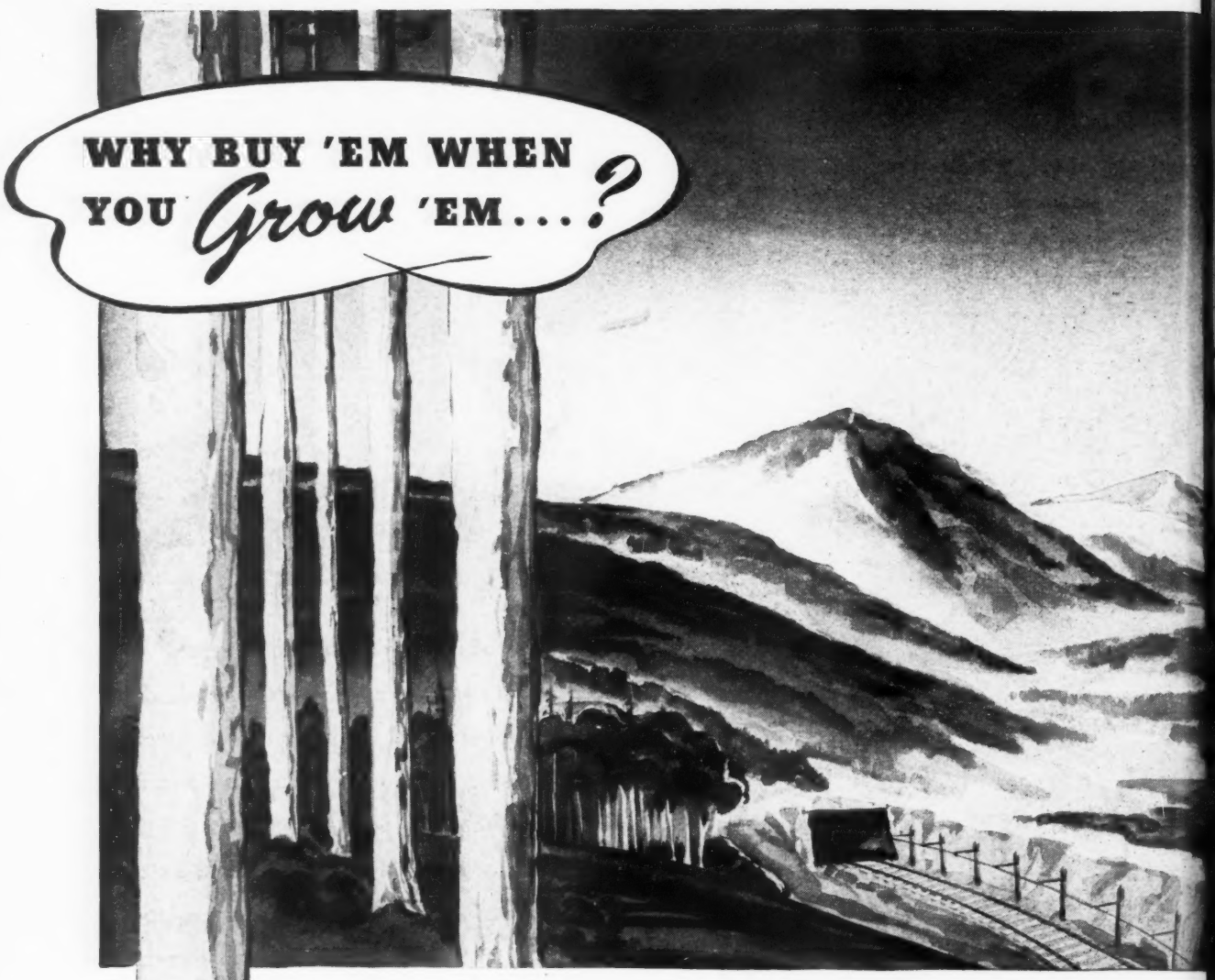
L CABLE'S OWN "BUREAU OF STANDARDS"



Assurance of standardized quality in the electrical wire and cable products supplied by General Cable starts with our firm control of raw materials. To insure absolute uniformity at all 9 manufacturing plants, each material used is accepted or rejected by the "Control Testing Laboratories" situated in each plant, to specifications established by the General Research Laboratory at Bayonne. The time of an entire Bureau of the General Research Laboratory is devoted to the setting of these standards and the devising and supervising of uniform tests to enforce them. Under such a program one does not have to hope for or demand quality control — one gets it.

GENERAL CABLE CORPORATION

Manufacturers of Bare and Insulated Wires and Cables for Every Electrical Purpose

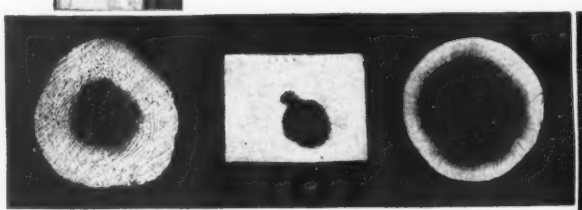


TREAT YOUR OWN TIMBERS WITH

OSMOSALTS

● A good percentage of mine properties are covered with good, usable standing timber...suitable for props, stringers and timber sets...yet often these essential mine supplies are bought elsewhere.

Such "green" timber, when treated with OSMOSALTS, will satisfactorily meet your requirements and reduce your operating costs as well. In addition to these savings, you will obtain dry, clean, odorless treated timbers which are both safe and easy to handle. Investigate. Write today for complete information and technical data.



Illustrated above are cross sections of three kinds of timbers. The white outer areas, which have been subjected to standard color reagent tests, show the deep penetration of the toxic chemicals in Osmosalts.

OSMOSALTS

Nature's Method of Wood Preservation

Composition and Process Patented and Patents Pending

OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.

GENERAL OFFICES: BUFFALO 12, N. Y.

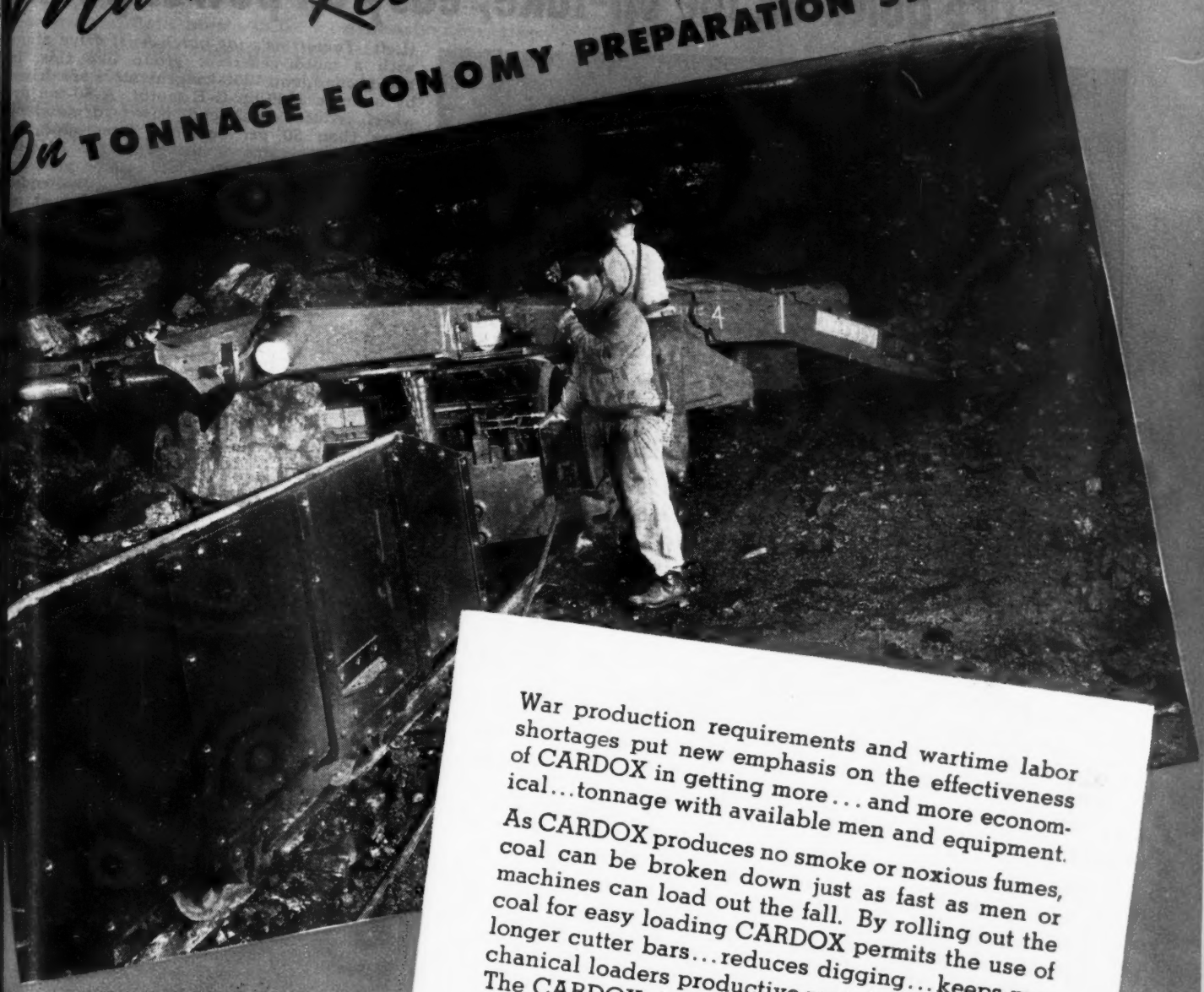
BRANCH AND SALES OFFICES: BIRMINGHAM 3, ALA.; DENVER 2, COLO.; KENOVA, W. VA.; HARLAN, KY.; MT. VERNON, ILL.

CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

Making Records

On TONNAGE ECONOMY PREPARATION SAFETY



War production requirements and wartime labor shortages put new emphasis on the effectiveness of CARDOX in getting more . . . and more economical . . . tonnage with available men and equipment.

As CARDOX produces no smoke or noxious fumes, coal can be broken down just as fast as men or machines can load out the fall. By rolling out the coal for easy loading CARDOX permits the use of longer cutter bars . . . reduces digging . . . keeps mechanical loaders productive more hours each shift. The CARDOX discharge causes little disturbance to roof and rib structure . . . decreasing the roof and rib hazards responsible for 51% of underground fatalities. CARDOX-mined coal is not weakened by shatter-cracks. This reduces handling, shipping and storage losses resulting from degradation.

Write for details on free test of CARDOX in your own mine.

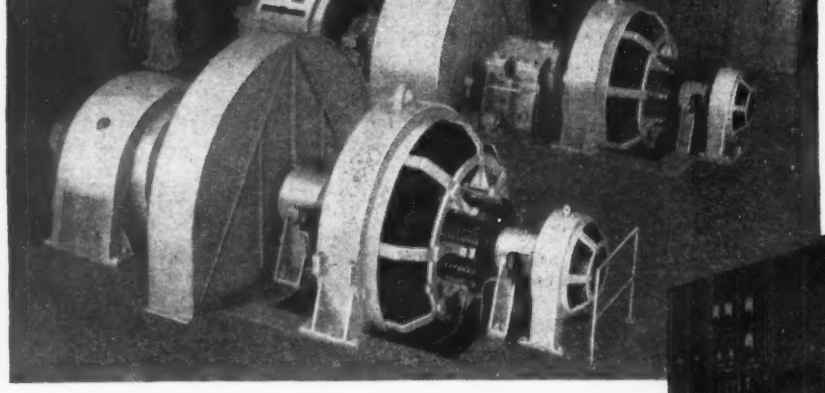
HARDSOCG DRILLING EQUIPMENT

...mplete line of drilling equip-...nt designed to give you the ...xi.num in drilling efficiency.

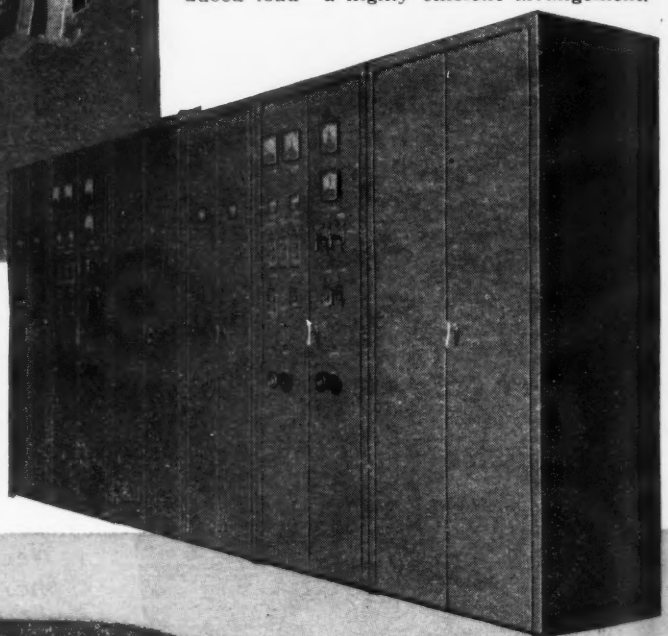
ARDOX CORPORATION BELL BUILDING · CHICAGO 1, ILLINOIS

26,000 lb... 3500 ft...

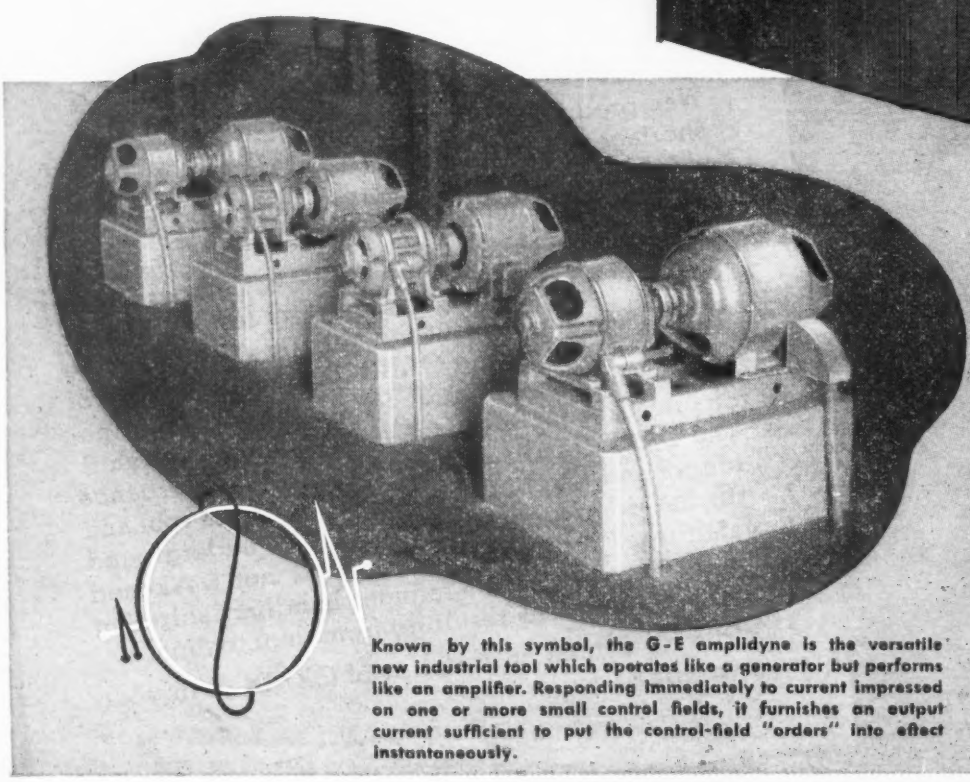
New G-E hoist drives with amplidyne control are quick on the up-take, easy on power peaks



(Left) *Tomorrow's top-notch hoist drive* starts with a motor-generator group like this. In background, two 1250-kw generators are driven by a single 2500-hp G-E motor. A 50-ton flywheel reduces peak-load power demand by more than 50 per cent. In foreground, an identical generator is driven by a 1250-hp motor. Power for both hoists can be provided by individual generators on the dual-ended unit when the main hoist is operating at reduced load—a highly efficient arrangement.



(Right) *Simplicity of control mechanism* made possible by the amplidyne is exemplified by these compact metal-enclosed panels. They contain the protective and regulating devices for the two d-c hoist systems.

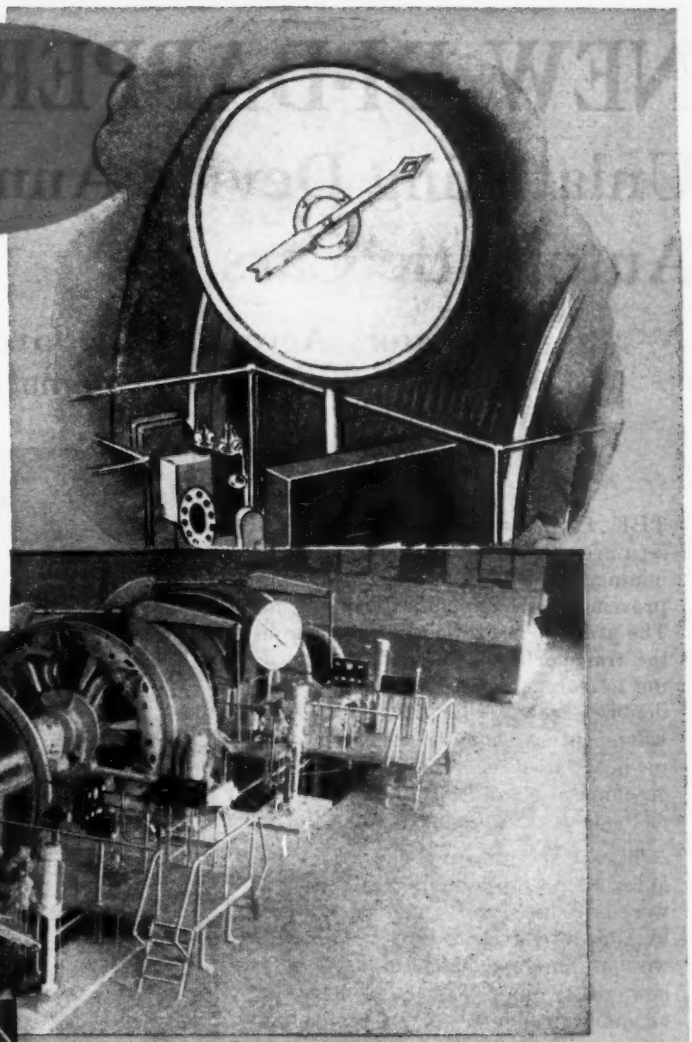


Known by this symbol, the G-E amplidyne is the versatile new industrial tool which operates like a generator but performs like an amplifier. Responding immediately to current impressed on one or more small control fields, it furnishes an output current sufficient to put the control-field "orders" into effect instantaneously.

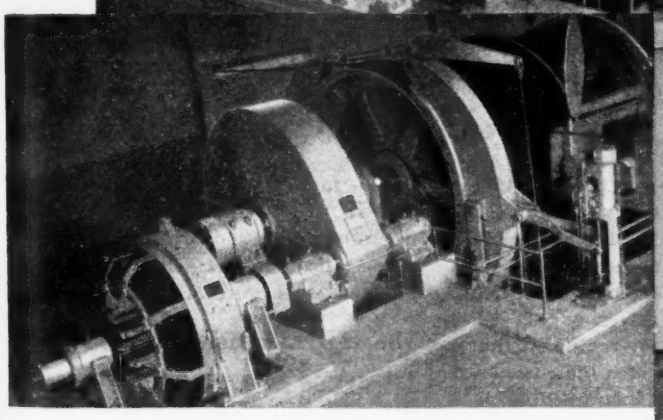
(Left) *Small but mighty,* the tw outer units are G-E amplidynes— the key to the fast response an low-cost operation of the hoist Operating as exciters, they greatl simplify efficient control of gene ator voltage within a safe curren limit. Acceleration is fast, for th "forcing" action of the amplidyn continually holds the load (hors power) at a safe maximum despi rapidly changing speeds. Durin shaft sinking, the system gav full control of the speed of heav down-going loads of steel and co crete without counterweight an with very little use of mechanic brakes. (Center units are dynami braking exciters that bring th motor-generator sets quickly rest as they are shut down.)

100 seconds!

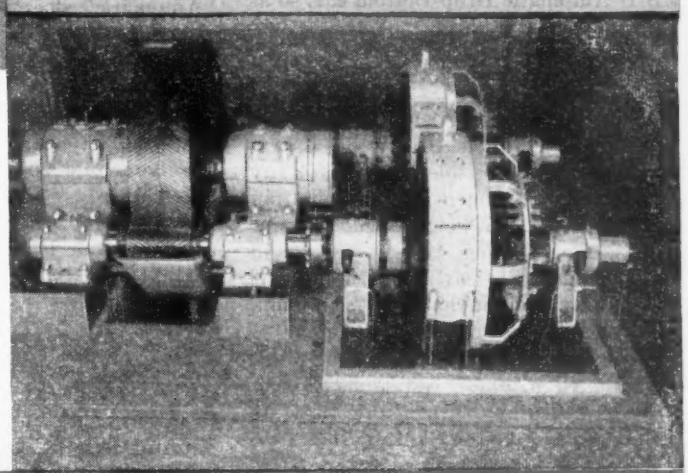
Here are two newly installed G-E hoist drives, each a pacemaker. Teamed up with the 3000-hp main hoist is a 1500-hp man-and-material hoist. Drive units for both are alike—one dual, one single—with three identical d-c hoist motors and identical d-c generators. Both hoists gain in responsiveness, simplicity, and efficiency because of their amplidyne control. Hoists like these will help you speed the production of coal.



(Above) *The pattern of the future* in mine-hoist installations is here shown on the job today. In foreground is the man-and-material hoist, driven by a single 1500-hp motor. Behind it is the main 3000-hp hoist, designed to raise 360 long tons per hour from a 3500-ft depth, with a maximum speed of travel of 2400 ft per min.



(Above) *Motor drive* for the smaller hoist—the G-E 600-rpm, 600-volt d-c motor operates a double-deck cage (12,000 lb) and a 15,000-lb load at speeds up to 2000 ft per min. (Counterweight, 19,500 lb)



(Right) The other two 1500-hp, d-c motors, geared to the double-drum main hoist. All three drive motors put into action the fast reponse and load-forcing characteristics of amplidyne control.

GENERAL ELECTRIC COMPANY, SCHENECTADY 5, N. Y.

657-34

GENERAL ELECTRIC

BUY WAR BONDS

NEW DI-DAPPER NOCK-OUT

Unlatching Device Announced For Automatic Cars

Operators Agree it is the Greatest Improvement Since the Invention of the Automatic Drop-Bottom Car.

Fig. 1. The single action S-D Automatic Di-Dapper Unlatching Device as car passes over it.

THE PAST twenty-five years have seen revolutionary changes in coal mining, due mainly to the constant improvements in mechanical equipment. The greatest improvement has come in the transportation of coal from heading to storage bins. This change is, no doubt, largely accountable for the development of many of the other implements used in producing coal. It accounts also for many of the modern methods used in mining today.

Twenty-seven years ago, the first automatic drop-bottom mining cars were introduced to the mining industry by Sanford-Day Iron Works. This was, without question, the beginning of a new era for mining. With this new type of mine car, new records of production and new records in the profits of operation quickly developed. The S-D Automatic Drop-Bottom Mine car proved, at once, that the mines using this new type of equipment could produce much more coal with less manpower, and thus increase profits greatly.

Throughout these twenty-seven years Sanford-Day engineers have worked constantly to improve the design of the S-D Automatic Drop-Bottom car, so as to increase the profits from the use of this type of car—and constantly cheaper operations have resulted.

The goals have been chiefly these: Man-less dumping—foolproof operation—greatest possible capacity for any given over-all dimensions—elimination of needless dead weight—smooth running, long lasting trucks—saving in lubrication cost—saving in the cost of electricity used in haulage—maximum reduction in cost of maintaining cars—reduction of coal breakage to the minimum. All of these results have been accomplished by the persisting effort of the engineers of the Sanford-Day Iron Works.

One of the outstanding improvements in the S-D "Automatic" was the 1-2-3 method of discharging the coal from the car. This was introduced in 1939. This kept breakage of the coal to the minimum. The S-D 1-2-3 "Automatic" has the important advantage over other bottom dumping cars in that it does not dump all of the coal through all doors at one time. In fact, the S-D 1-2-3 "Automatic" does not actually dump the coal. Rather, it lays the coal down gently through one door opening at a time upon the bed of coal directly underneath so that the coal does no real dropping. Also the bin is filled to the top from one end to the other—and automatically. This feature not only reduces the breakage of coal, but its easy operation lengthens the life of the cars.

New "Nock-out" Device

Probably the greatest improvement in the automatic drop-bottom car since its invention, and its first production by Sanford-Day, is the new S-D Automatic Di-Dapper "Nock-out". This is an automatic nock-out unlatching device. Operators who have seen it in use are most enthusiastic about its simplicity, safety, and value.

(Advertisement)

This new "Nock-out" device is available in two types. One is electrically operated and is shown in Figure 3. The other—the Automatic Di-Dapper type is shown in Figures 1 and 2.

The S-D Electrical "Nock-out"

Figure 2 shows the S-D Automatic Nock-out mechanism which is raised to its unlatching position by the operation of the electro-magnet, or solenoid, which is shown directly under the car bumper. The proper timing of this electrical operation is accomplished by the wheels of the car, which close two switches to create a closed electrical circuit when the car has reached a certain point. The Nock-out mechanism falls out of the way after the hooks have been unlatched.

The S-D "Di-Dapper Nock-out"

The S-D Automatic Di-Dapper is the simpler nock-out device, and is therefore preferred for most installations. In Fig. 1, the photograph shows the mine car just after it has passed over the S-D Automatic Di-Dapper Nock-

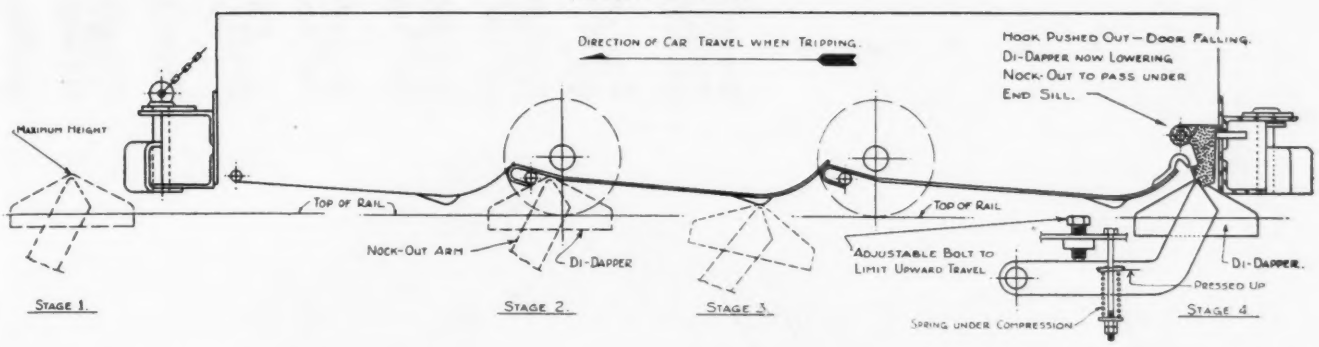


Fig. 2. This line-drawing illustrates the S-D Automatic Di-Dapper Nock-out mechanism as it passes under an S-D 1-2-3 Automatic Drop-Bottom Car having three doors. Stage one of the drawing shows the mechanism just before the forward bumper depresses it. Stages 2 and 3 show the mechanism passing gently underneath car. At stage 4, the mechanism automatically rises (by the action of compressed spring) to a point where it engages the forward faces of the door-supporting latch hooks. Each car has two such mechanisms, and each mechanism automatically comes into contact with one of the latch hooks and forces it back *positively* into its unlatched position.

out mechanism. The door latch-hooks are now in their unlatched position. The picture shows a single Di-Dapper controlling the two separate arms which nock-out the two latch hooks. Our standard practice however, is to provide two independent Di-Dappers. Under Fig. 2, a clear explanation is given of the operation of the S-D Automatic Di-Dapper Nock-out mechanism.

Outside Mechanism Eliminated

All of the conventional outside tripping mechanism has been eliminated from the car. The old-fashion latch-lever arm which extended beyond the side of the car, and which had to be raised by hand or by some mechanism alongside of the track has been done away with. No protruding lever arms to be bent in collisions, etc. remain. The Automatic Di-Dapper Nock-outs at the bin unlatch the two independently-operated catches from underneath the cars. Two latches are now provided instead of the former single latch hook. This promotes greater safety. Two years operations have proved the extraordinary value of this new unlatching mechanism. The first 100 cars equipped with this automatic latch were put in use in August 1942, and hundreds of others have been installed since. Operators using it say that it makes the S-D 1-2-3 Automatic Drop-Bottom Car absolute perfection for transferring coal.

Emergency Unlatching

In some installations it is necessary to discharge certain cars containing slate or rock while enroute to the tipple. To do this, the selected cars may be tripped by hand in the manner shown in Fig. 3. The hand-operation is very simple. On the contrary, if cars of slate are to pass over the coal bin without discharge, the knock-out mechanism

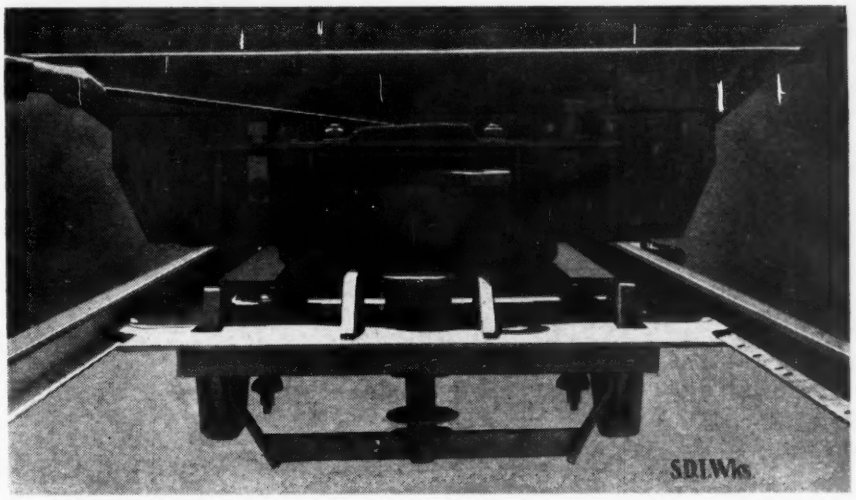


Fig. 3. The S-D Electrical Nock-out Unlatching Device operated by electro-magnet.

can be lowered by hand so that certain cars will pass over the bin without being discharged.

Write us, and we will tell you all about these new trouble-savers, speed-uppers, and super-safety devices. We will tell you where you can see them in operation. The Pruden Coal & Coke Co., of Pruden, Tenn. got the first 100 cars. One of the largest producers of coal who uses S-D "Automatics" with great satisfaction, and also with great savings, in more than 5 mines, recently said that he wouldn't consider using anything else from now on except a Drop-Bottom car which can be unlatched by a practical "Nock-out" unlatching device. And, we have just this sort of mechanism, tested and proved.

BUT FINALLY, AND ABOVE ALL: S-D 1-2-3 "AUTOMATICS"

The greatest savings, after all, comes from using S-D 1-2-3 Automatic Drop-Bottom cars rather than rotary or end-dump cars. We say this although we also make a full line of maximum capacity rotary and end-dump cars. If you wish, we will send you histories of coal mines where end-dump and rotary cars have been scrapped, and where new S-D 1-2-3 Automatics have been installed in place of them. The savings made by these mines as taken from their book-records, were from *20¢ a ton to 57½¢ a ton.* This ignores the reduced breakage of coal.

Sanford-Day Iron Works

KNOXVILLE **TENNESSEE**

• • • • • MARKETING

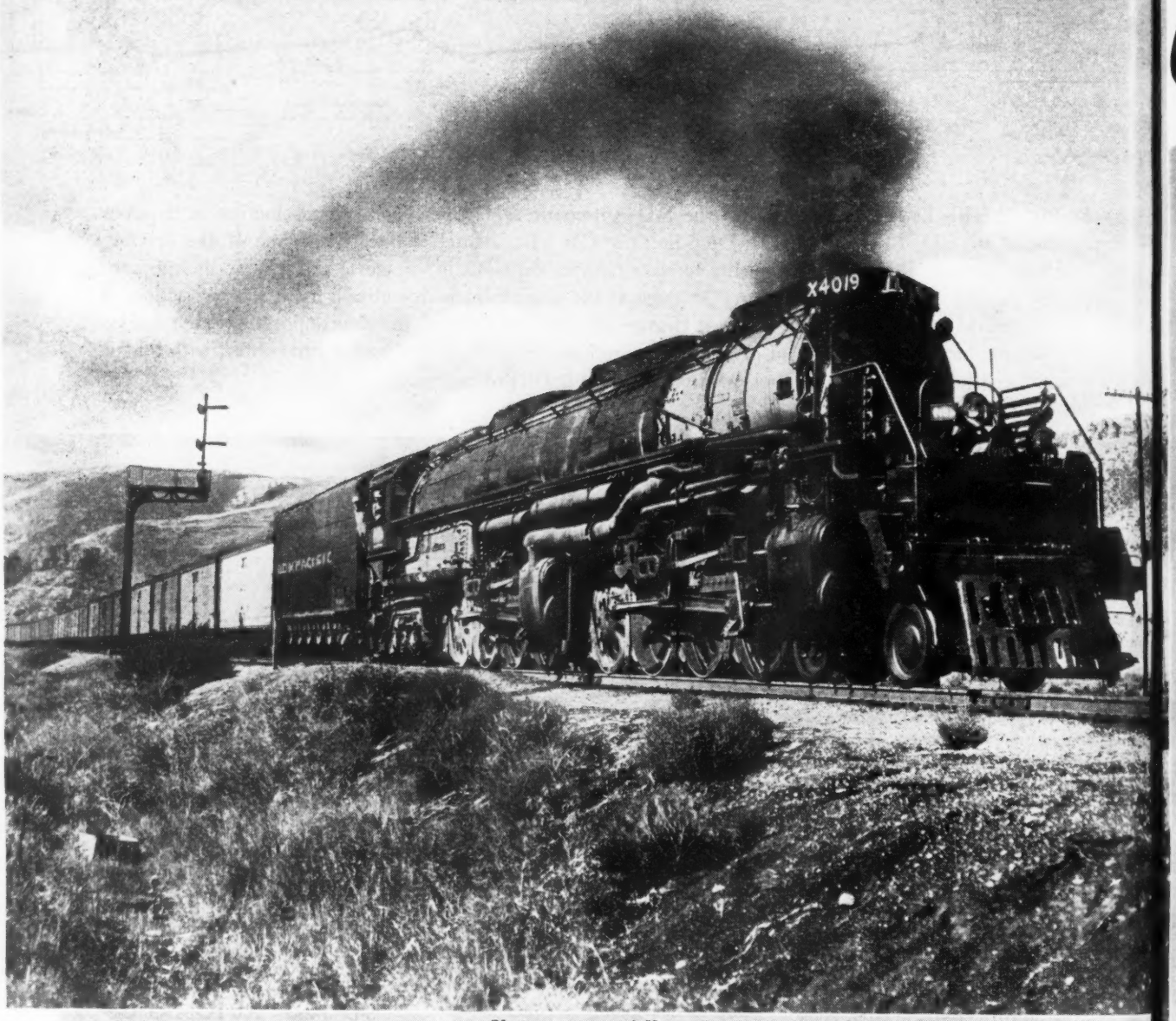


Photo courtesy of Union Pacific Railroad

Will the railroads turn to WASHED COAL?

• Many crack passenger trains are now fired with prepared coals—sometimes purchased from independent mines. The day may not be too far distant when all railroad coal-fired traffic . . . freight and passenger . . . will be fueled with prepared coal.

Crossroads AHEAD!

YOU can't tell by the picture whether this Union Pacific "Big Boy" is approaching a crossroads or not. But you know there is one ahead somewhere along the line. The average coal operator is going to have many "crossroads" ahead—but soon. He must be prepared to choose his course before he reaches the crossing (they call it Post War Planning currently).

Consider what might happen to established coal markets:

- ***Will the railroads (your best single customer) want more washed coal?***
- ***Will the utilities (annually using over 100,000,000 tons) want more coal for pulverizing?***
- ***Will demands for stoker coal multiply tenfold?***
- ***Will there be unexpected shifts in customer requirements at Tidewater or the Lakes?***

These are just a few possible changes which may develop.

Yes, these are all marketing "crossroads," BUT the production man must definitely reckon with them too because they can completely upset production schedules. Selling prices will be revised (by competition or legislation) and, unless mining costs are low enough, so called "natural" markets may be lost.

ALLEN & GARCIA COMPANY, through experienced, practical, and timely engineering, can help you to perfect facilities and to successfully meet the problems you will encounter at your "crossroads."

SCOPE OF A & G *Services*

- ★ **Design and construction of new plants and their various units**
- ★ **Organization, operation, and management of mines**
- ★ **Below ground modernization and mechanization**
- ★ **Reconstruction, revamping, or improvement of existing plants**
- ★ **General consulting work regarding power, equipment, operation, and various mining problems**
- ★ **Valuations for financing, fire-loss, taxation purposes — reports and appraisals**

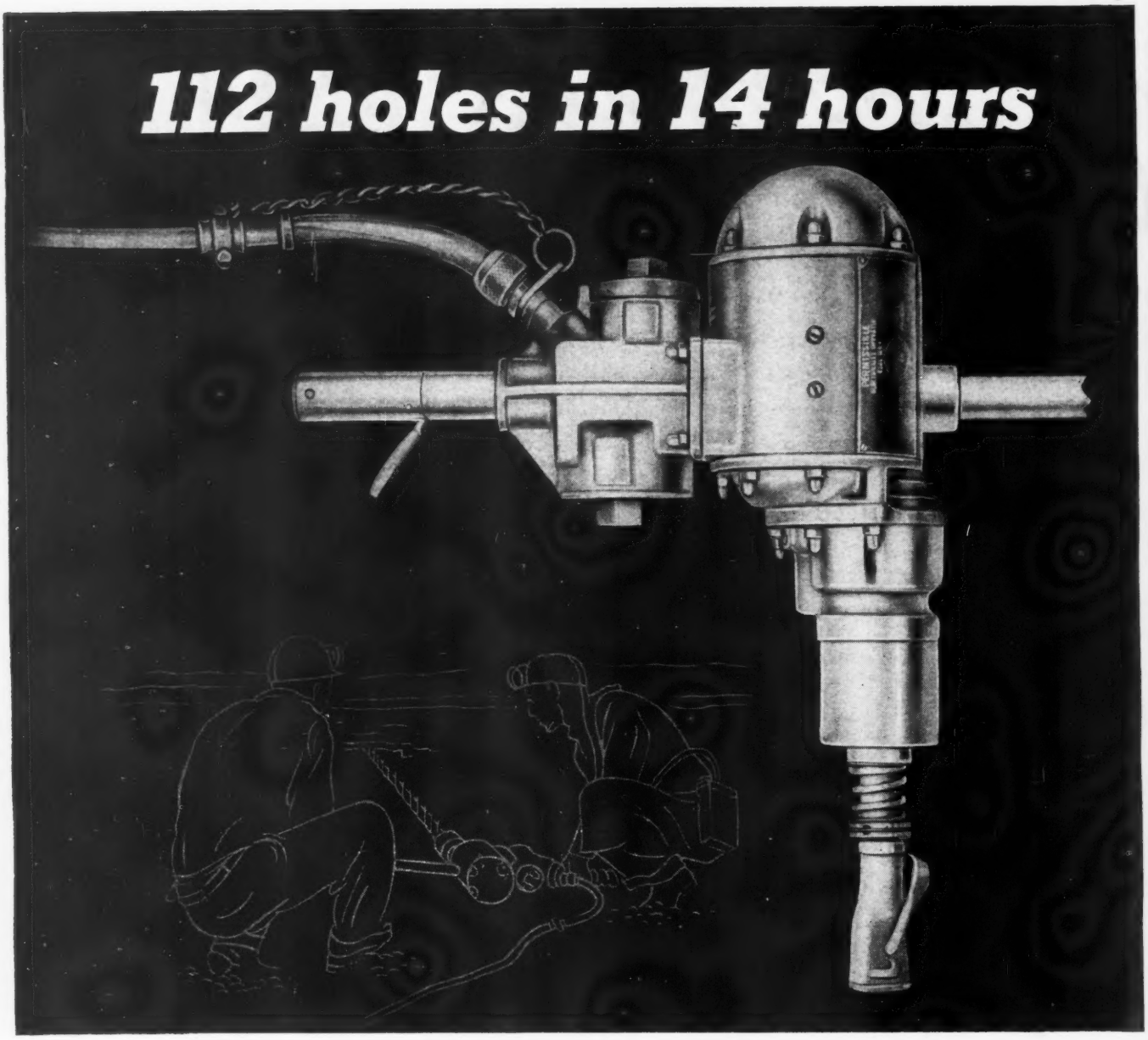
WE WORK with undivided responsibility to you, at a fixed fee. We are not hampered by any connections which might prejudice the true professional engineering approach to the problem.

ALLEN & GARCIA COMPANY

CONSULTING AND CONSTRUCTING ENGINEERS

332 S. MICHIGAN AVE., CHICAGO, ILL. • 120 WALL ST., NEW YORK, N. Y.

112 holes in 14 hours



CP No. 572 Permissible Hand-Held Coal Drills

CP No. 572 Permissible Electric Coal Drills with Safety Clutch, in the difficult drilling Alma seam, are performing regularly at the rate of 112 holes, 2¼" diameter by 7 feet deep, for each day of two seven-hour shifts. Drilling time ranges from 1 minute, 10 seconds, to a maximum of 1 minute, 30 seconds, per hole.

CP design features include unusual accessibility for examination of parts, light weight, and a safety clutch for release in case an auger sticks — a valuable protective feature for the operators and motor. Write for Catalog 902.

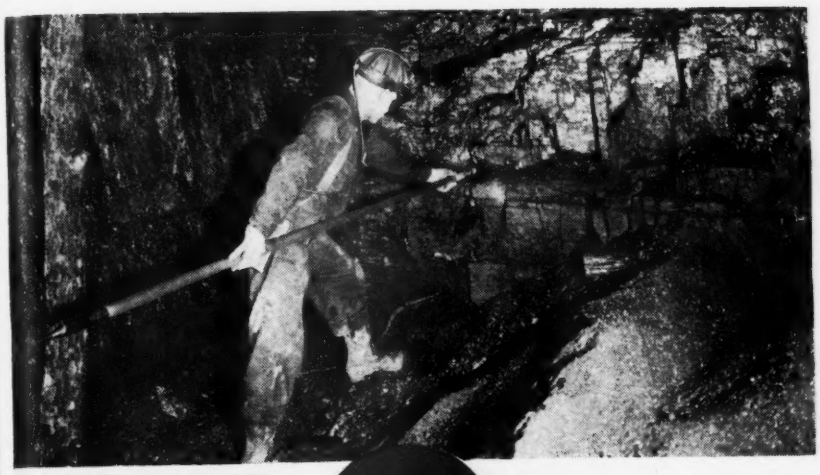
CP offers the largest line of Hand-Held and Post-Mounted electric coal drills: five sizes of the Hand-Held type; and four sizes of the Post-Mounted type.

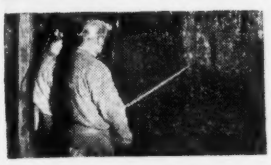
★★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

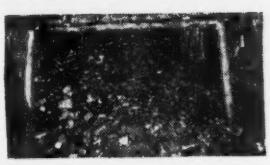
CHICAGO PNEUMATIC
TOOL COMPANY

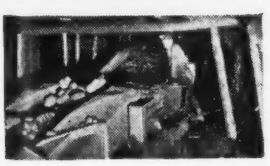
General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES









AMERICAN
CYANAMID & CHEMICAL CORPORATION
EXPLOSIVES

Load and tamp carefully

Many times the blasting agent in use has been blamed for faulty results or misfires when some slight change in loading methods, depending on conditions, is all that is needed to provide perfect blasting. However, one fundamental rule is

Put in explosives of the right velocity and density . . .

The required characteristics are assured in AMERICAN explosives as they are products of intensive research, chemical control, thorough inspection and unremitting care in manufacture.

- *Capable field engineers are available at your call.*

★ **HIGH EXPLOSIVES**
★ **PERMISSIBLES**
★ **BLASTING POWDER**
★ **BLASTING ACCESSORIES**

American Cyanamid & Chemical Corporation

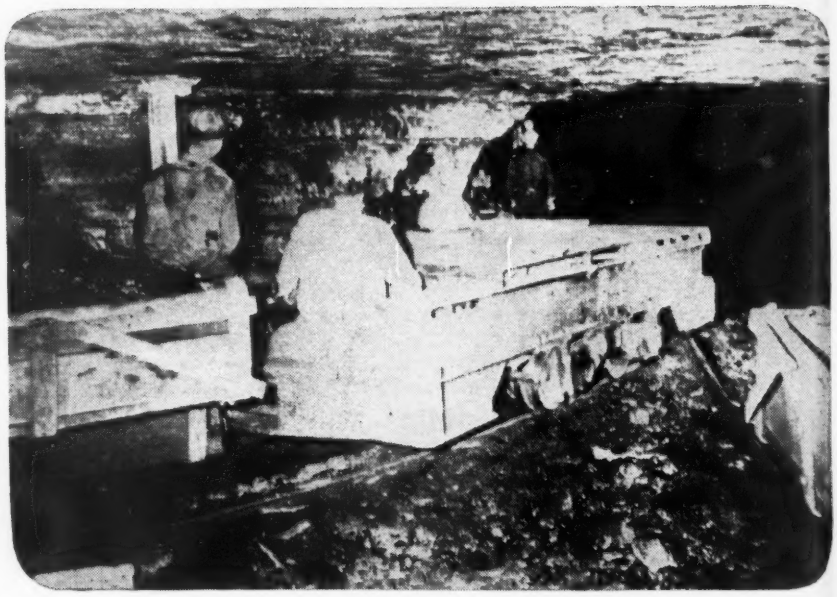
A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

EXPLOSIVES DEPARTMENT

SALES OFFICES: Pittsburgh, Pa. Bluefield, West Va. Scranton, Pa. St. Louis, Mo. Chicago, Ill. Pottsville, Pa. Hazleton, Pa. Maynard, Mass.

How Alkaline Batteries Cut Haulage Costs



Alkaline batteries average a life of 10 to 12 years in the mine where the photograph of this gathering motor was taken.

MOTOR FALLS 75 FEET DOWN WASTE DUMP; BATTERY DAMAGE: ONE CELL CONTAINER AND ONE PLATE GROUP

Although the rule is to keep the motor back of the cars when dumping waste, some green help reversed the order and took out a train with the motor ahead. Then the motorman moved the controller in the wrong direction.

The motor jumped the stop chain, went 75 feet down the dump, throwing out its alkaline battery which came to rest on one side. The battery was sent to our service station to determine whether or not it was still serviceable. Result: one cell container and one plate group were found to be damaged and were replaced. The cells were then tested; all delivered full rated capacity.

The steel cell construction of alkaline batteries which is the reason they survive accidents with so little damage, is also an important reason for the extra dependability they deliver under more normal conditions.

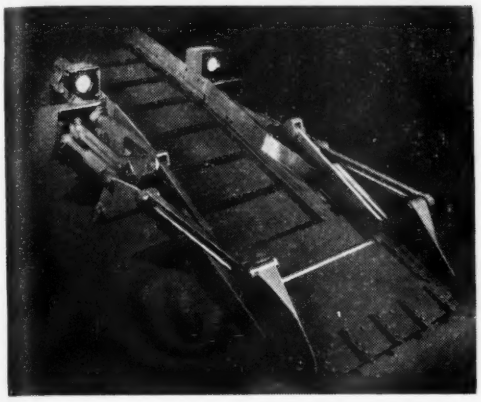
Use of Edison Alkaline Batteries in battery-operated locomotives and shuttle cars will help cut your haulage costs in several ways.

Perhaps most important, their unequaled dependability gives the closest approach to failure-free uninterrupted haulage it is possible to obtain. This is due partly to their steel cell construction which withstands rough usage, partly to their alkaline electrolyte which is a preservative of steel, and partly to their electrochemical principle of operation which is free from self-destructive reactions.

They do not require critical adjustment of charge rates, hence can be charged direct from the d-c power supply through relatively inexpensive resistors without need of motor-generators. They can be fully recharged in 6 to 7 hours and require no equalizing which helps get all charging done during off-peak periods.

Finally, they give much longer service life than any other type of battery. *Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, New Jersey.*

Edison
ALKALINE BATTERIES



The loader with the natural, smooth, easy, shovel action loading head.

Dependability Was Never So Important

It's times like these that prove the efficiency of any mining machine but never before have mechanical loaders, so brutally, been put to the test of performance. The Whaley "Automat" is meeting every punishing demand in double and triple shift work, whether in coal loading, whole seam mining, or rock and slate work. And, it's doing the job, turning out big tonnage day in and day out, at lowest maintenance cost.

Dependability was never so important . . . the demand for the Whaley "Automat" never so great. The "Automat's" reputation for keeping so everlastingly at its job, under severe conditions, is due to its exclusive smooth working, automatic, shovel action loading head . . . the loader that takes the material as it finds it . . . the only loader that will load—in its stride—any lump of coal that will pass through your tipple, or any lump of rock your cars, aerial tram or larry, can take. Plan now for your loading machine needs in 1945. Myers-Whaley Company, Knoxville 6, Tenn.

MYERS-WHALEY

Mechanical Loaders Exclusively for Over 36 Years

More Lump at Lower Cost with

"LUMP COAL" C

Day-in and day-out, more "Lump Coal" C is used in U. S. coal mines than any other permissible.

The answer is simple —"Lump Coal" C produces more and better lump at lower cost.

The action of "Lump Coal" C is close to that of black powder. It has a slow, strong, heaving action that moves the coal away from the face—so mechanical loaders can reach it quickly and efficiently. Further, "Lump Coal" C often results in the use of fewer holes . . . thereby reducing drilling costs and saving explosives.

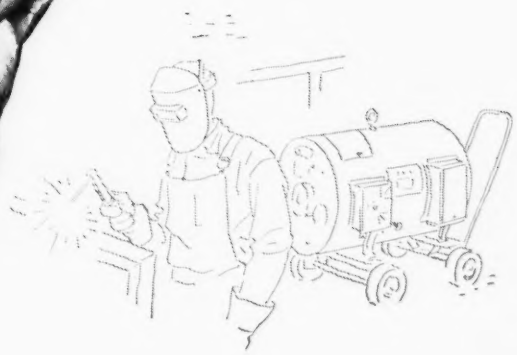
Talk with your Du Pont Explosives representative. He'll be glad to give you the facts on "Lump Coal" C, the permissible that outsells all other permissibles. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington, Del.

INVEST IN VICTORY—BUY MORE WAR BONDS

DU PONT PERMISSIBLES

Blasting Supplies and Accessories

There are more *than 20 different Du Pont Permissibles. You'll find a type and grade for every job and every problem. Ask about them!*



Both AC and DC WELDING with the *Same* ELECTRODE!

Here they are . . . two new P&H electrodes — which perform equally well on either AC or DC!

Thoroughly proved in a wide variety of work, these remarkable new electrodes deliver an arc that is extremely stable, easily controlled and produces fine, uniformly strong welds.

You've waited for this . . . to simplify your welding problems — to make your electrode buying easier . . . to save time and money. Convince yourself—on your own welding jobs — that they are a practical answer to better welding at lower costs.

Place a trial order *today!*

AC-1 (E-6010 and E-6011)

For AC, and either polarity on DC. • Tensile strength, 65,000-70,000 P.S.I. • Yield, 55,000-60,000 P.S.I. • Ductility, (2"), 25% to 35%. • Available in all sizes — 14" and 18" lengths.

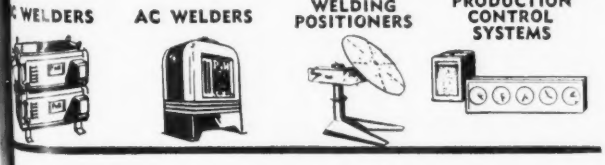
Conforms to requirements of: U. S. Navy Bureau of Ships specifications 46-E-3 Grade 3, Class 1, 2 and 3. • Hartford Steam Boiler and Insurance Company. • American Bureau of Shipping. • Lloyds Register of Shipping.

AC-3 (E-6012 and E-6013)

For AC, and either polarity on DC. • Tensile strength, 65,000-70,000 P.S.I. • Yield, 55,000-60,000 P.S.I. • Ductility, (2") — 18% to 25%. • Available in all sizes — 14" and 18" lengths.

Conforms to requirements of: Hartford Steam Boiler and Insurance Company. • American Bureau of Shipping. • Lloyds Register of Shipping. • *Full information and procedures on request.*

A COMPLETE ARC WELDING SERVICE



General Offices:
4540 West National Ave., Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION
WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

Canadian Distribution: The Canadian Fairbanks-Morse Co., Ltd.

Every day is laundry day

WHEN MAKING COAL FOR COKE OVENS

The basins of rich metallurgical coal are being exhausted rapidly. Mechanical mining and loading produce coal which in the raw state is unsuitable for metallurgical coke in many instances. Steel companies are overcoming these obstacles by washing their coking coal in McNally-Rheo washing plants.

Many advantages are gained, such as . . . reduction of the ash and sulphur in the coke produced . . . decreased tonnage of small size coke . . . improved porosity . . . greater yields of by-products in proportion to the increased percentage of volatile matter in the washed coal . . . and improvements in blast furnace operations due to the use of fine quality metallurgical coke.

Laundry day at the mines pays big dividends in blast furnace operation. It likewise enables operators to open up new mines for which a market could not be found if the coal were offered in the raw state. It converts coal into specification fuels which bring premium prices.

Our technical staff is available for consultation with coal producers anywhere in the world, and at a time convenient to you.

A typical steel company metallurgical coal washing plant designed and erected by McNally Pittsburg.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corp. Michig

What Goes On in a *Mc Nally-Rheo Launder*

Plenty! Impurities are removed from coal of all sizes, from 6″ to zero, in a progressive washing process. This process utilizes the flotation method by which the mechanical gravity set up in a stream of water in troughs or launders separates the coal from its impurities.

The cream of the coal (75% to 80%) is recovered in the first stratification without further processing. Following launders progressively rewash the primary rejects, recovering marketable coal of somewhat lower grade or size. In the larger sizes the laminated material can be crushed and rewashed in the same system and the coal values recovered.

Cleaning results and recoveries, of unparalleled efficiency, make the McNally-Rheo Launder an economical addition to any plant.

There is much more to tell you about the McNally-Rheo Launder which is explained in detail in our catalog. Our technical staff is also available to go over your property and make recommendations.

RG
R FUEL

acturing Corp. Michigan Ave., Chicago 1, Ill. • Pittsburg, Kansas • Koppers Bldg., Pittsburgh 19, Pa. • Caixa Postal 1310, Rio de Janeiro, Brazil

ROCK OR DIRT DUMPED *Instantaneously*

MORE TRIPS PER HOUR

Time saved on the fill is time saved for every trip . . . more trips per hour . . . more production per shift. The Koehring Dumptor dumps any type material *instantaneously*. Seconds saved over mechanical dumping method speeds up every hauling and dumping job. Rock or dirt is dumped equally fast and the load is dumped clean every time . . . ready for a full load every trip.

KOEHRING COMPANY
Milwaukee 10, Wisconsin

DEPEND ON YOUR KOEHRING DISTRIBUTOR
to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

KOEHRING HEAVY DUTY

ARMY E NAVY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

"This is mighty tough stuff"

says *Rōmey

Rome Cable's "60-38" Single Conductor ocomotive Gathering Cable feeds power this six-ton locomotive used behind ading machine in the Emily Mine of the lonongahela Rail and River Coal Co.

To do the toughest, roughest job in the mine—and do it well—a locomotive gathering cable must take it on the chin day and night, and stand the gaff for months and months of uninterrupted service.

It's a job that Rome Cable's famous "60-38" has been picked to do in many mines—mines where other dependable Rome Cable products are doing their jobs equally well.

ROME'S "60-38" SINGLE CONDUCTOR LOCOMOTIVE GATHERING CABLE

The ideal Locomotive Cable with complete adhesion between copper conductor and the insulation. It is protected overall with a tough Neoprene jacket. This cable is recommended for electric locomotives of the gathering reel type or any other service requiring a flexible, heavy duty portable cable, where extreme adhesion of the insulation to the conductor is desired.

THE CONDUCTOR is composed of rope stranded, tinned copper wires. The individual ropes are laid up in a special manner to resist both tension and torsion.

A SPECIAL INSULATION is used, which has high electrical qualities and extreme adhesion to copper conductor, which prevents separation of the conductor from the jacket.

HEAVY TWINE REINFORCEMENT CORDS are applied over insulation to strengthen the cable and control adhesion between insulation and jacket.

THE NEOPRENE JACKET is vulcanized in continuous lead molds and has a high tensile strength, maximum resistance to tearing and abrasion, and long aging characteristics.

Copr. 1944 RCC

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

*Extreme

"Tycol EP Lubricants" have proved in extensive field applications their ability to more than meet the requirements of the services for which they are recommended.

Let a Tide Water engineer help you select the proper Tycol lubricant for your needs. His familiarity with Tycol's complete line of lubricants — plus his extensive experience in all phases of industrial lubrication — is your assurance of trouble-free lubrication. Call or write your nearest Tide Water office for further information.

TIDE WATER ASSOCIATED OIL COMPANY

MAKERS OF THE FAMOUS VEEDOL MOTOR OIL • Eastern Division: 17 Battery Place, New York 4, N. Y.

Principal Branch Offices: Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

DRUMS! DRUMS! DRUMS!
War needs make it extremely important that all empty drums be returned immediately.

SCIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE **TYCOL**

PRESSURE (No 2)

* This is the 12th of a series of informative messages concerning the meaning and significance of commonly used tests and terms employed to describe the characteristics of lubricating oils.

TIDE WATER LUBRICANIA

DEFINITION: Extreme Pressure Lubricants are lubricants which, under certain operating conditions, permit carrying of loads greater than can be supported by mineral oils of similar viscosity.

This property of greatly increased load carrying capacity may be imparted by incorporation of suitable addition agents. The merits of EP Lubricants are defined by test and performance, rather than by chemical composition alone.

NOTE: The slight increase in load carrying ability which occurs when fatty oils are added to mineral oils is not sufficient to justify such products being termed Extreme Pressure Lubricants.

LABORATORY TEST METHODS: A number of laboratory machines are used for measuring load carrying capacity of lubricants. A series of EP Lubricants evaluated by these machines may not be rated necessarily in the same order, presumably because of differences in design and details of operation among the machines. Caution must be observed in interpreting results derived from any of these individual test methods. The degree of correlation claimed between results from laboratory measurements and those from field performance has not been positively established.

Among the more common machines employed in the laboratory to evaluate load carrying capacity of lubricants are:

The Timken Tester
The Almen Machine
The Falex Lubricant Tester
The Floyd Machine
The Four Ball Machine and
The S.A.E. Machine

At times each type of apparatus has been claimed by its proponents to be a reliable means of evaluating lubricants for a given use. No one machine is recognized generally by technologists as an exact means for predicting field performance of lubricants in all types of service. However, by using any one test machine to compare a lubricant of unknown merit with others of known service performance in a restricted field, some indication of the utility of the unknown lubricant may be secured.

S.A.E. machine for testing EP lubricants, one of many machines used for this purpose.

INDUSTRIAL TYCOL OILS-GREASES

Gasoline Powers the Attack — Don't Waste A Drop

INDUSTRIAL LUBRICANTS

Can you identify a Synthetic Rubber Conveyor Belt by looking at it?

No, to the eye, a synthetic rubber conveyor belt looks exactly like one made of natural rubber. Nor can you judge by its looks how much compounding skill has gone into it, how carefully it has been fabricated, to what rigid tests and inspections it has been put.

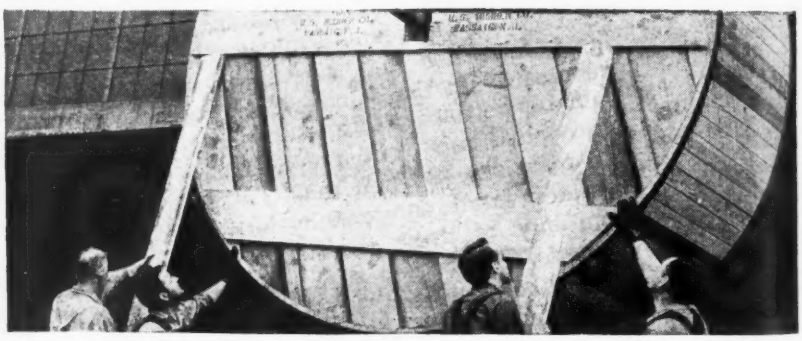
These are the things that determine the tonnage a belt will convey during its life, the trouble-free service it will deliver, the savings it will effect in operation.

The one safe guide is the maker's name. U.S. Rubber Conveyor Belts have long enjoyed the highest reputation. The "U.S." Belts of synthetic rubber are upholding that reputation. Each is individually designed...each engineered from the scene of action for a particular installation.

"U.S." Synthetic Rubber Belts are the result of unremitting research, of accumulated technical knowledge, of skillful craftsmanship applied through modern, scientific laboratory and manufacturing facilities.

SERVING THROUGH SCIENCE

LABORATORY CONTROL—is a basic rule in the compounding of materials for U.S. Rubber Conveyor Belts. The particular type of synthetic rubber to be used is determined by the service conditions to be met; the ingredients are mixed with scientific exactness.



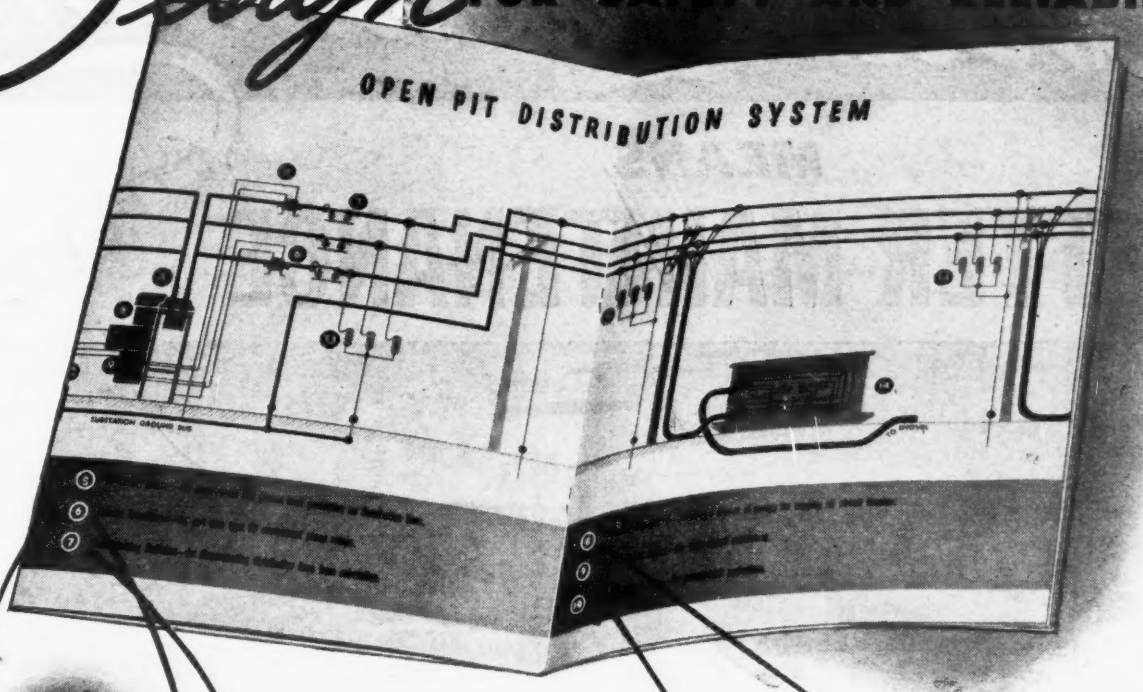
A GIANT GOES FORTH—Crated and ready for shipment this big fellow is on its way into service at an important coal mine. U.S. Rubber Conveyor Belting—hundreds of thousands of feet of it—is helping to handle big loads of vitally important products such as coal, limestone, ore and other bulk materials.

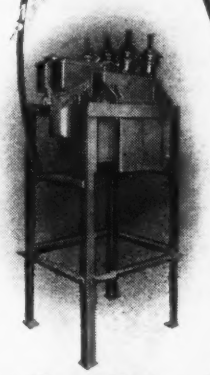
Listen to the Philharmonic-Symphony program over the CBS network Sunday afternoon, 3:00 to 4:30 E.W.T. Carl Van Doren and a guest star present an interlude of historical significance.

UNITED STATES RUBBER COMPANY

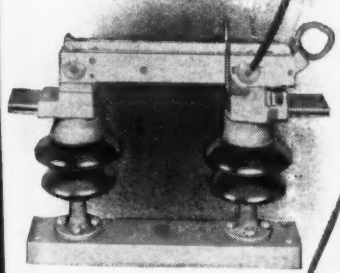
1230 SIXTH AVENUE, ROCKEFELLER CENTER, NEW YORK 20, N. Y. · *In Canada:* DOMINION RUBBER CO., LTD.

Design FOR SAFETY AND RELIABILITY

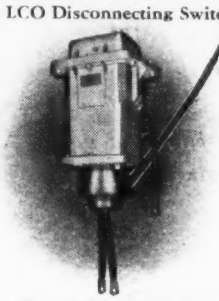




Type FO-22-A Outdoor Oil Circuit Breaker.



Type LCO Disconnecting Switch

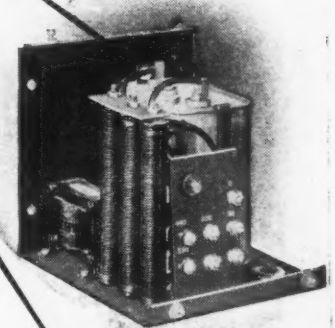


Type WO-15 Current Transformer

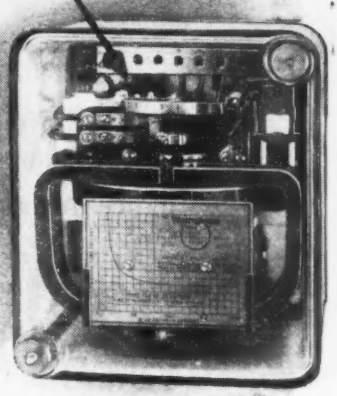
In open-pit mining, there is only one way to assure peak production with complete safety for your employees. Be sure your distribution system has been *designed* to include *every* factor for safety and reliability.

Perhaps your present system is entirely adequate. But it will pay you to check it against accepted standards. Usually, adequate protection can be secured with few changes. Additional equipment may not be necessary—or a few inexpensive protective devices may turn the trick.

To help you in determining whether or not your present system needs a thorough check-up, Westinghouse has prepared a new book on the important subject of open-pit distribution systems. It explains the equipment needed for safety and reliability—and tells why. Complete diagrams, like the one illustrated above, clearly show the advantages you get with the correct equipment. Write today for your copy of B-3282. And if you need the additional help of our engineering staff, just call our nearest office. You'll get their immediate co-operation. Westinghouse Electric & Manufacturing Company, Dept. 7-N, East Pittsburgh, Penna. J-94610



Capacitor Trip Device with cover removed.



Type CO Over-current Relay.

Westinghouse

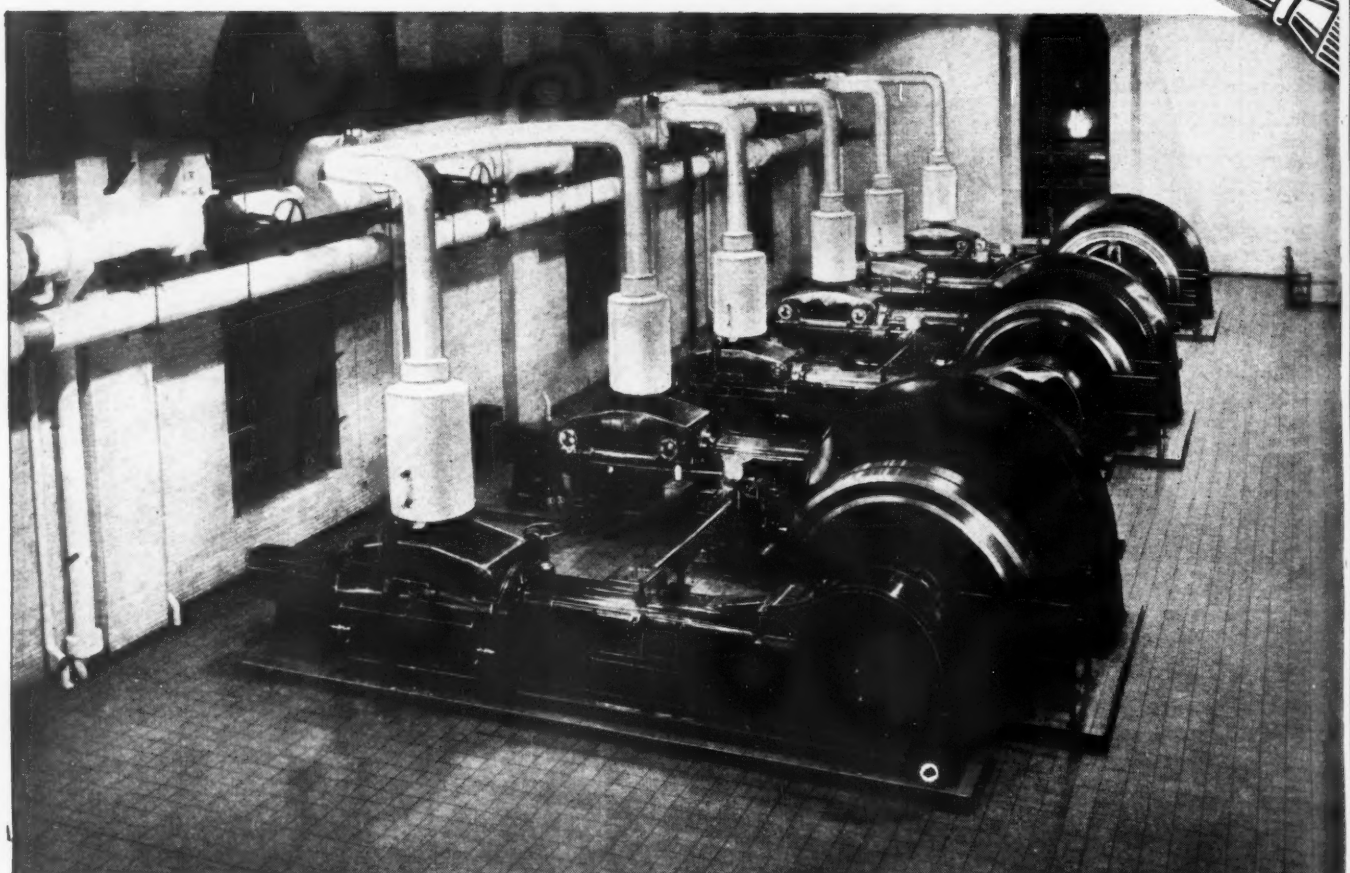
PLANTS IN 25 CITIES... OFFICES EVERYWHERE

Electrical Equipment for the Mining Industry

Correct Lubrication

MEANS

BETTER MAINTENANCE



• Very often, *correct* lubrication is the remedy for difficult maintenance due to excessive wear.

For *correct* lubrication of *STEAM ENGINES* Sinclair provides Steam Cylinder and Valve Oils that satisfy all combinations of temperature, pressure, speed, and moisture conditions . . . that suit all engine designs and operating conditions.

• • •

(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)

SINCLAIR INDUSTRIAL OILS

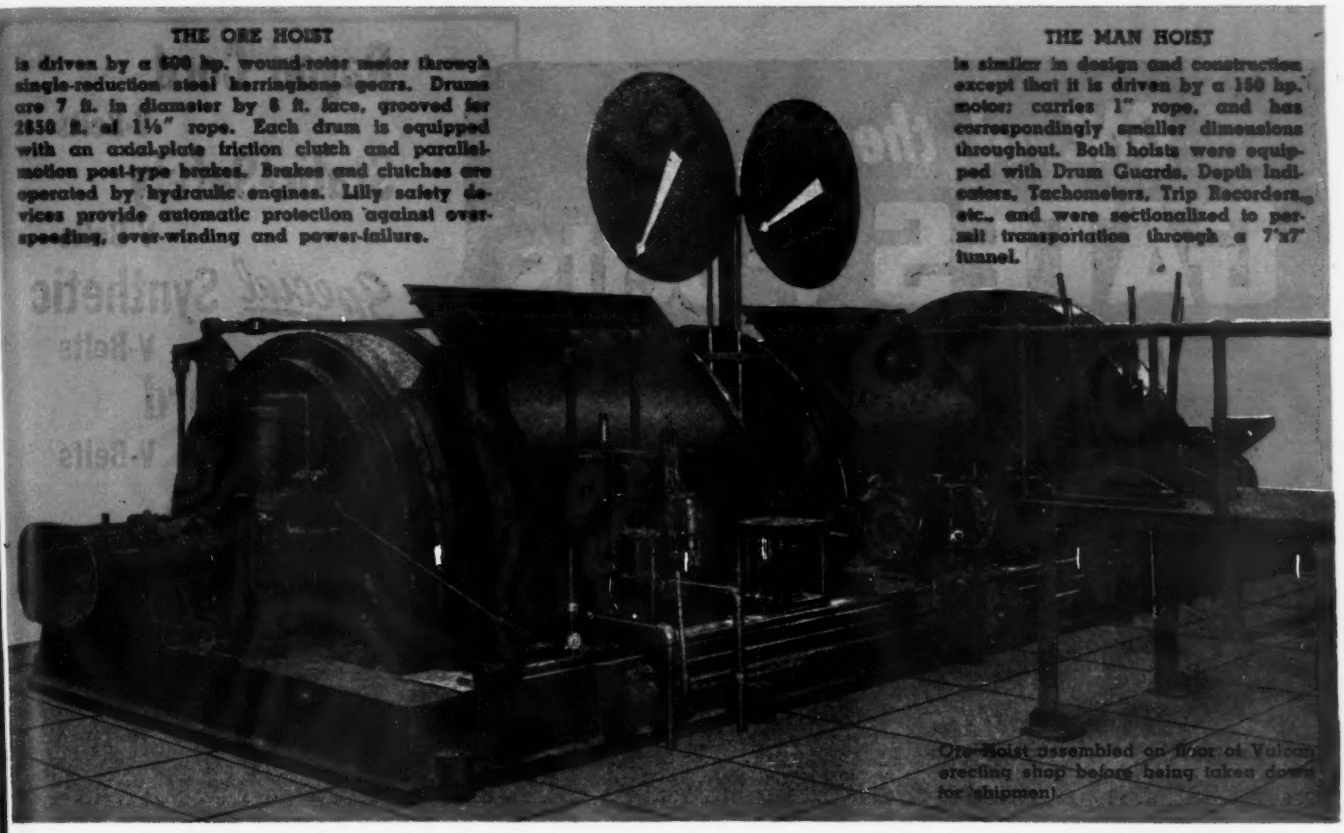
FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

THE ORE HOIST

is driven by a 600 hp. wound-rotor motor through single-reduction steel herringbone gears. Drums are 7 ft. in diameter by 8 ft. face, grooved for 2850 ft. of 1¼" rope. Each drum is equipped with an axial-plate friction clutch and parallel-motion post-type brakes. Brakes and clutches are operated by hydraulic engines. Lilly safety devices provide automatic protection against over-speeding, over-winding and power-failure.

THE MAN HOIST

is similar in design and construction except that it is driven by a 150 hp. motor; carries 1" rope, and has correspondingly smaller dimensions throughout. Both hoists were equipped with Drum Guards, Depth Indicators, Tachometers, Trip Recorders, etc., and were sectionalized to permit transportation through a 7'x7' tunnel.



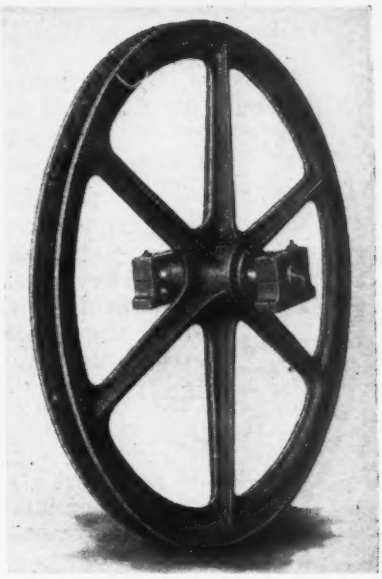
Ore Hoist assembled on floor of Vulcan erecting shop before being taken down for shipment

Modern Hoists for a Famous Mine

Nestling among the majestic peaks of the Cascade Range, near the northern boundary of the State of Washington, the Holden Mine of the Howe Sound Company (Chelan Division) is one of the World's most efficiently-operated copper producers. The fact that Vulcan recently furnished two similar outstanding hoists for this famous property is, therefore, a matter for legitimate pride and we take pleasure in presenting the accompanying illustration and data.

In this case, as on most other large hoist jobs, our engineers cooperated with the purchaser's engineers in developing a design to meet their particular requirements with highest possible efficiency and lowest ultimate expense. Besides having all other modern operating conveniences and safety features these two hoists are equipped with a distinctive system of dynamic braking, with single-lever control and safety interlocks, which, in itself, assures important savings.

Correspondence regarding any present or prospective requirement for specially-designed hoists is cordially invited and will receive prompt attention from our experienced engineering executives.



"ALLCASTEEL" SHEAVES

For each of the hoists described above we furnished two Vulcan "Allcasteel" Sheaves equipped with anti-friction bearings. Light, strong and highly resistant to rope wear, these sheaves are machined after heat-treatment and can be relied upon for many years of true-running, rope-preserving service.

VULCAN IRON WORKS

Established 1849

Main Office and Works **WILKES-BARRE, PA.,** New York Office 50 Church

Heavy-Duty Electric Hoists	Shaking-Chute Conveyors	Steam Locomotives	Load-Carrying Larries
Self-Contained Hoists	Chain Conveyors	Diesel Locomotives	Rotary Kilns, Coolers and Dryers
Scraper Hoists	Cast-Steel Sheaves and Gears	geared and electric drive	Crushing Rolls and Pulverizers
Car-Spotting Hoists	Cages, Skips and Gunboats	Gasoline Locomotives	Briquetting Machines
Room Hoists	Coal-Preparation Equipment	geared and electric drive	Ball, Rod and Tube Mills

ONE of these GATES V-Belts Will Fit ANY NEED You May Have!

Rayon Cord V-Belts
Static-Safety V-Belts
***Special* Synthetic V-Belts**
Cotton Cord V-Belts
Steel Cable V-Belts

If you have a drive on which V-Belts of special construction may be required for greatest service efficiency, you will almost certainly find that Gates has long been building a V-Belt precisely engineered to fit your special needs.

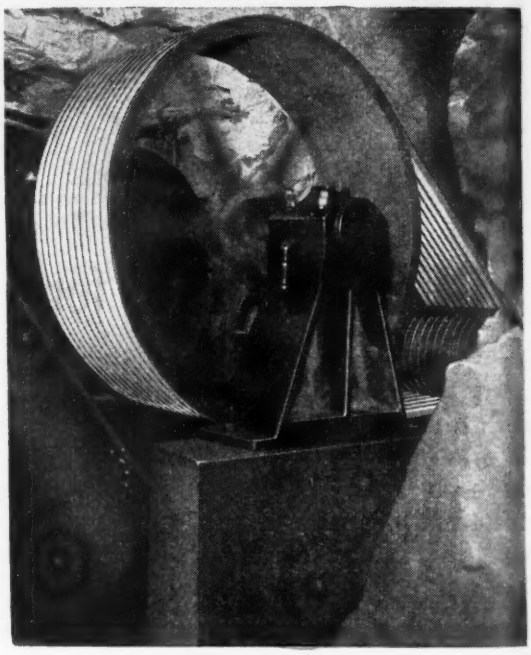
On some installations, for example, a V-Belt, the tension member of which is composed of rayon cords will have advantages over the standard cotton cord construction. Gates has been building Rayon-Cord belts since 1939.

Again, Gates Rubber Engineers have found that a belt built with flexible steel cables as the tension member is sometimes most economical despite its higher initial cost—and Gates has been building flexible Steel-Cable V-Belts since 1935.

For more than six years, the Gates Synthetic Rubber belt has been making amazing service records in large industrial plants all over the United States. Under severe conditions of heat and oil the Gates special Synthetic belt actually wears 2 times to 3 times as long as any natural rubber belt ever used.

It might seem that it would be some trouble to determine whether a synthetic-rayon, a synthetic-steel-cable, or a standard Gates Vulco Rope would be most efficient and economical for your particular application. Actually, this involves no more than picking up your phone.

There is a Gates Rubber Engineer in every industrial center. A phone call will bring him to your plant. He is a specialist in drive operation. He is completely informed on the nature and advantages of every type of belt. He will always recommend the practice that will be most efficient and economical for you



***In one of the World's* LONGEST TUNNELS**

This big blower keeps the air clear in the 13.2 mile Alva B. Adams Tunnel which was "holed-thru" the Continental Divide on June 10. After firing a round, workmen may return to mucking immediately with the air free from smoke or powder fumes. On this big installation, the Gates RUBBER ENGINEER specified standard Vulco Ropes which have performed with splendid efficiency. 448

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

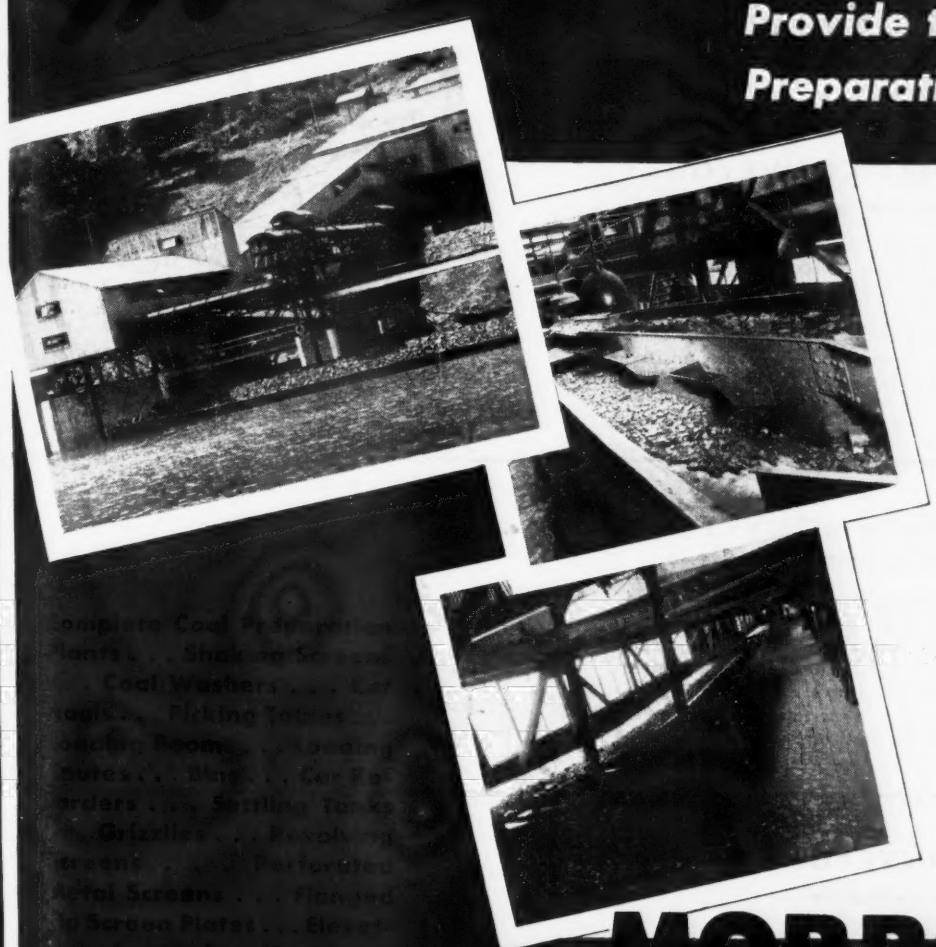
CHICAGO, ILL. 549 West Washington
NEW YORK CITY 215-219 Fourth Avenue
ATLANTA, GA. 738 C & S National Bank Building
LOS ANGELES, CAL. 2240 East Washington Boulevard
DENVER, COLO. 999 South Broadway
DETROIT, MICH. 8663 Grand River Avenue
PORTLAND, ORE. 333 N. W. 5th Avenue
DALLAS, TEXAS 2213 Griffin Street
SAN FRANCISCO, CAL. 1090 Bryant Street

COAL AND COAL BY-PRODUCTS

Will provide POST-WAR JOBS and Assist in NATIONAL PROSPERITY

—Only If Coal receives proper Preparation at the mines

Provide the Proper Preparation Facilities



For over 25 years Morrow engineers have designed and built efficient, dependable coal preparation plants and coal handling equipment to provide the coal industry with a cleaner, properly sized consumer product.

Let Morrow design and build your new preparation plant or completely modernize your present plant.

MORROW

IT'S NOT ONLY WHAT WE'RE *It's what we have*

★ Realistic things that you can *see, feel* and *compare* count most of all in solving Today's problems . . . guarantee the safest assurance of capably filling the requirements of Tomorrow! *A background of low-cost performance* . . . that's what La-Del Underground Conveyors and Mine Ventilating Fans have to offer. That's the rich heritage in store for future La-Del products. La-Del Engineers —always aiming to improve—assure products that are not only kept constantly up-to-date, but are also, *by comparison*, well into the future.

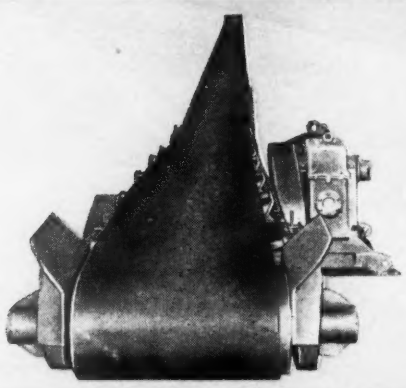
Low Cost Operation • Complete Engineering Service

LA-DEL MINE EQUIPMENT

UNDERGROUND BELT CONVEYORS

Room, Gathering and Haulage Types

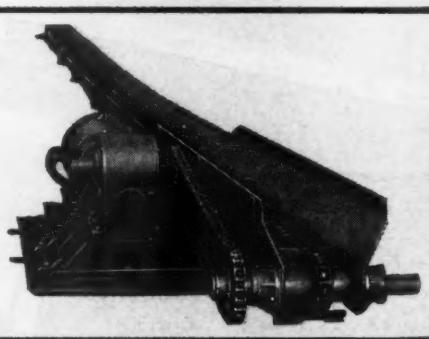
Most major coal operators use La-Del Belt Conveyors. Their popularity has been won by a host of features, all contributing to low cost operation. *Exclusive, sealed for life* precision ball bearings on belt idlers reduce power consumption and maintenance costs. Mechanical improvements reduce operating costs, eliminate spillage and increase belt life. Design improvements assure positive alignment for all conveyor lengths whether operated forward or reverse.



UNDERGROUND CHAIN CONVEYORS

Room, Face and Gathering Types

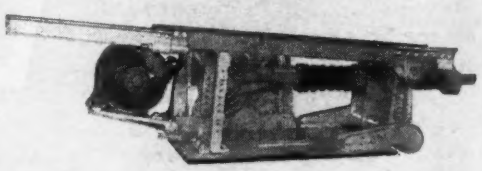
All power transmission parts are liberally oversize for long, efficient life. Drives are reversible to right or left hand side. Drag chain sprockets are chilled steel rim, using an undercut, self-cleaning tooth that sheds material. Conveyor head shaft is carried in heavy-duty sealed ball bearing housings. Drive and discharge section is mounted on a detachable levelling plate to insure alignment and ease in moving. Conveyor is reversible for handling supplies.



SHAKER CONVEYORS

Cushion Drive . . . Flexible

Extreme simplicity, through elimination of large quantities of mechanical parts, features these cushion drive shaker conveyors. Extensions to conveyor may be made to either or both sides of the drive. Flexibility is assured because turns may be installed to move the conveyor at 90 degrees across the face or at practically any angle. Extensions or reductions in conveyor length are simply and easily made. Mechanical simplicity guarantees low maintenance.



COMPLETE LINE OF UNDERGROUND CONVEYORS FOR LOW COST OPERATION

GOING TO HAVE FOR YOU . . .
for you ALREADY!

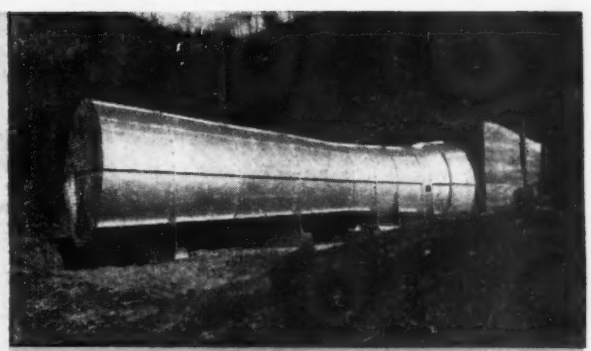
Increased Safety • Improved Working Conditions

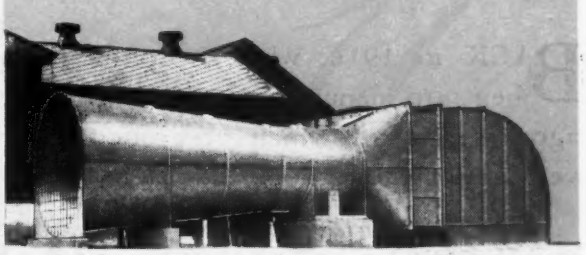
LA-DEL TROLLER VENTILATING FANS

Axial Flow
FANS AND BLOWERS

La-Del Troller Mine Ventilating Fans and Blowers were *first to employ the Axial Air Flow principle.* Equipped with exclusive adjustable pitch propeller blades, they are designed and custom-built for peak efficiency and uniform "on-a-line" air flow distribution. Streamlined belt fairings fully enclose drive belts, prevent air leakage, protect belts from air stream and avoid the turbulence ahead of fan blades. Straightening vanes behind propeller blades correct helical air motion imparted by blades to a true axial flow. Streamlined tail maintains uniform axial flow without turbulence. Fan efficiency is directly affected by stack efficiency, so both the fan and stack are limited as to the volume they will pass without excessive energy loss. Gradual expansion throughout a carefully calculated stack length results in uniform air flow and low exit velocity.

(NOTE: Present La-Del axial flow fan production is consumed by the Navy.)





La-Del Troller 5 foot diameter high pressure fan (above) coupled to drift opening. Below, a 6 foot diameter high pressure fan, on exhausting service, coupled to air shaft hood. Range of capacities to meet all mine requirements.

LA-DEL ENGINEERING SERVICE

La-Del Engineering Service provides the mining industry with specialized knowledge of highly-trained, expert engineers for design, planning, specification and installation problems. La-Del has a conveyor system and a ventilating fan for every mine requirement. And La-Del Engineering Service guarantees the right installation for each specific need. For product information or a consultation with a La-Del Engineer, write today!

BUY MORE WAR BONDS . . . AND KEEP THE BONDS YOU BUY!

ARMY E NAVY

LA-DEL CONVEYOR & MFG. CO.

New Philadelphia, Ohio

. . . ORIGINATORS OF AXIAL FLOW FANS FOR EFFICIENT AIR CIRCULATION

Upson-Walton Specifications for Steel Wire have Never been relaxed!

BACK in 1916, when Upson-Walton first began to manufacture wire rope, we set up rigorous standards which every foot of steel wire we use must measure up to.

Those standards have never been lowered. Even material shortages in these war years have not been allowed to influence them.

All Upson-Walton wire rope sold today is, at the very least, as good as the finest quality we've ever made. In some respects it is even better, where engineering improvements have been added.

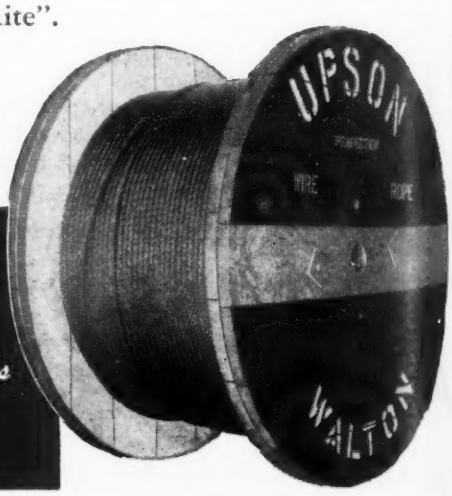
When you specify Upson-Walton, you're always sure of getting the best grade of wire rope. And it costs no more!

When you want Preformed, specify "Upson-Walton Lay-Rite".

U-W

Established 1871

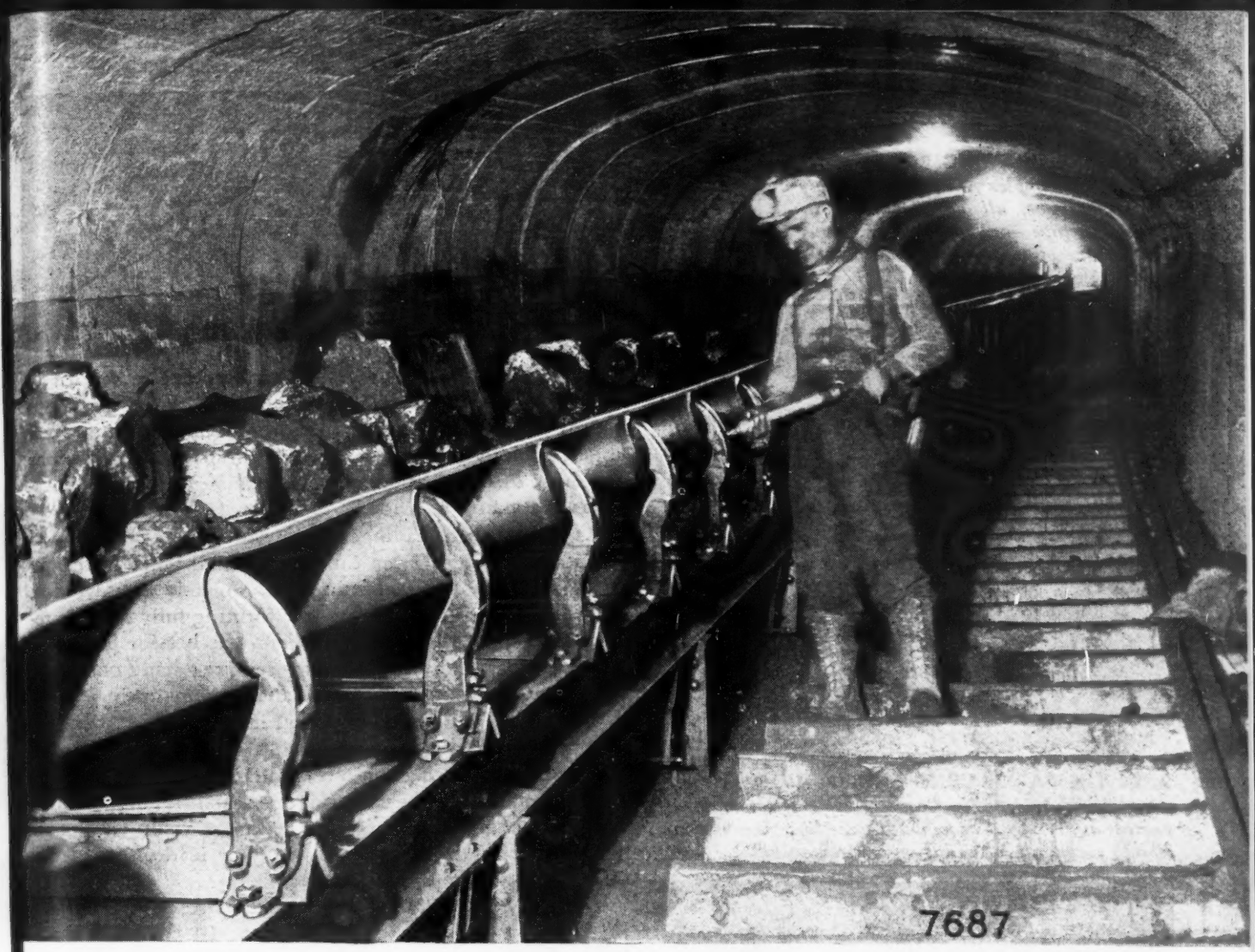
Upson-Walton also manufactures wire rope clips, thimbles and sockets; tackle blocks, snatch blocks, turnbuckles and shackles.



THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

NEW YORK • PITTSBURGH • CLEVELAND • BUFFALO • CHICAGO



an S-A Belt Conveyor 54 in. wide and 800 ft. long, the heaviest belts ever installed. This belt conal from the bottom of the mine to the surface art of a completely mechanized coal mine.

Going Up

The RIGHT Equipment Engineered by S-A Into the RIGHT System

On One of the Industry's Heaviest Conveyor Belts

o handle coal from mine to loadg, fast and efficiently, is a problem mmon to all operators. But the lution to that problem varies atly from mine to mine. That is y a specialized approach . . . one h as Stephens-Adamson offers . . . is sought by progressive operators.

This specialized approach includes two important S-A contributions: *First,* the manufacture of the exact equipment any given handling problem involves; and *Second,* the engineering ability to utilize that equipment in a handling system that assures lowest cost handling and utmost time, labor and maintenance savings.

Let S-A work with you on your present or anticipated handling problems. Write today for information.

STEPHENS-ADAMSON MFG. CO.

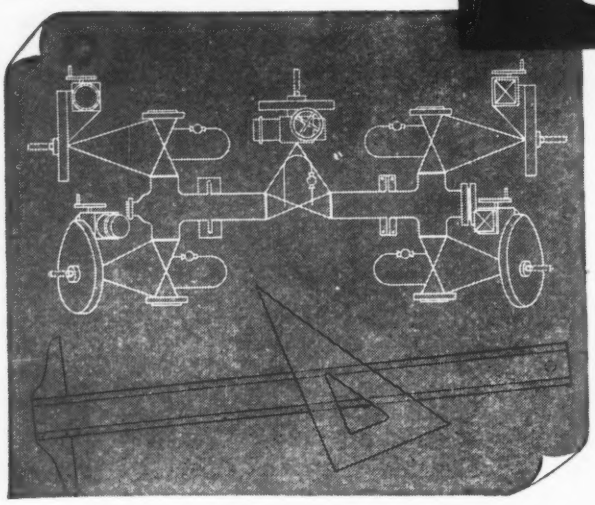
6 RIDGEWAY AVENUE, AURORA, ILLINOIS — LOS ANGELES, CALIF. ★ BELLEVILLE, ONT.

Designers and Manufacturers of All Types of

BULK MATERIAL HANDLING EQUIPMENT

Shop-Fabricated Assemblies . . A Complete Service from CRANE

1. ON THE DRAWING BOARD — *No matter how complex your piping assembly design may be, all parts—valves, fittings, and pipe—are supplied by Crane. One source of supply—one order covers everything.*



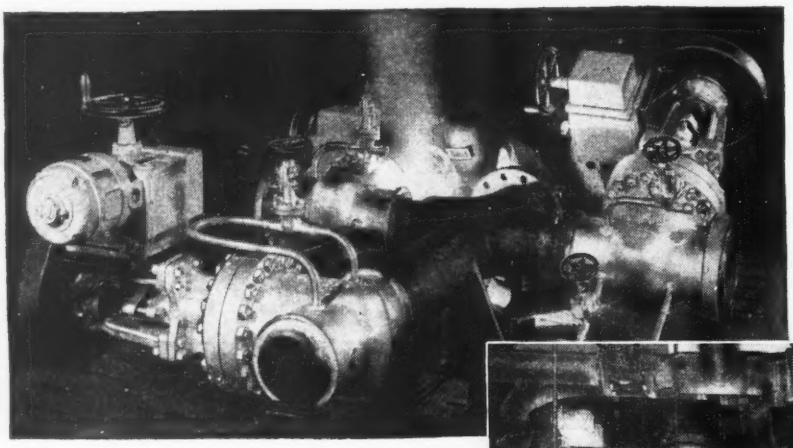
SHOP-FABRICATION typifies Crane complete service in the highest degree. Your blueprint in Crane Pipe Shops means delivery to your installation of a unit meeting every intent of design. For at Crane, no job is too small—none too large or complex—and absolute adherence to specifications is a matter of pride.

As the world's leading supplier of valves, fittings, and fabricated piping, Crane Co. produces all types of header assemblies of valves and fittings. Completely shop-welded, stress-relieved and tested, and conforming fully to code requirements, such Crane-built units—whether for power or processing systems, high or low pressure—stand out as the finest combinations of materials and workmanship.

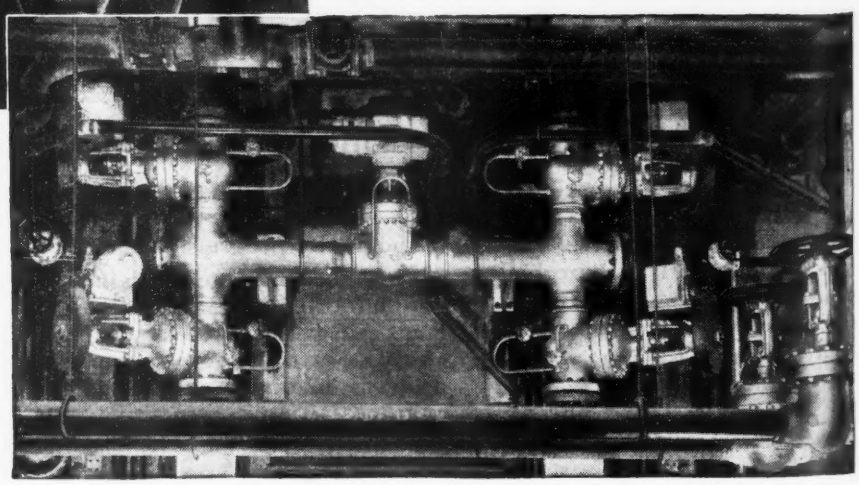
The same rigid control applied in making Crane valves and fittings marks every pipe shop operation. From raw materials to finished assemblies, one high standard of quality is maintained by the most elaborate facilities in the industry. Your complete satisfaction with every job is assured by Crane Co.'s 89-year leadership in the piping equipment field.

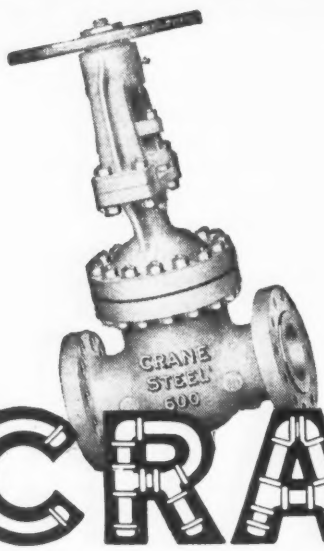
Crane Co., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas.*

2. IN THE FABRICATING SHOP — *All designs are completely fabricated by Crane. Proper selection of all parts is assured by the complete Crane line. One responsibility covers all materials and workmanship.*



3. ON THE JOB—*With Crane materials and Crane craftsmanship in every part, one standard of quality guards the entire assembly. Shown is the completed 12 x 8 x 4 in. header assembly of 600-pound cast steel motor-operated gate valves and fittings, installed in a central station.*



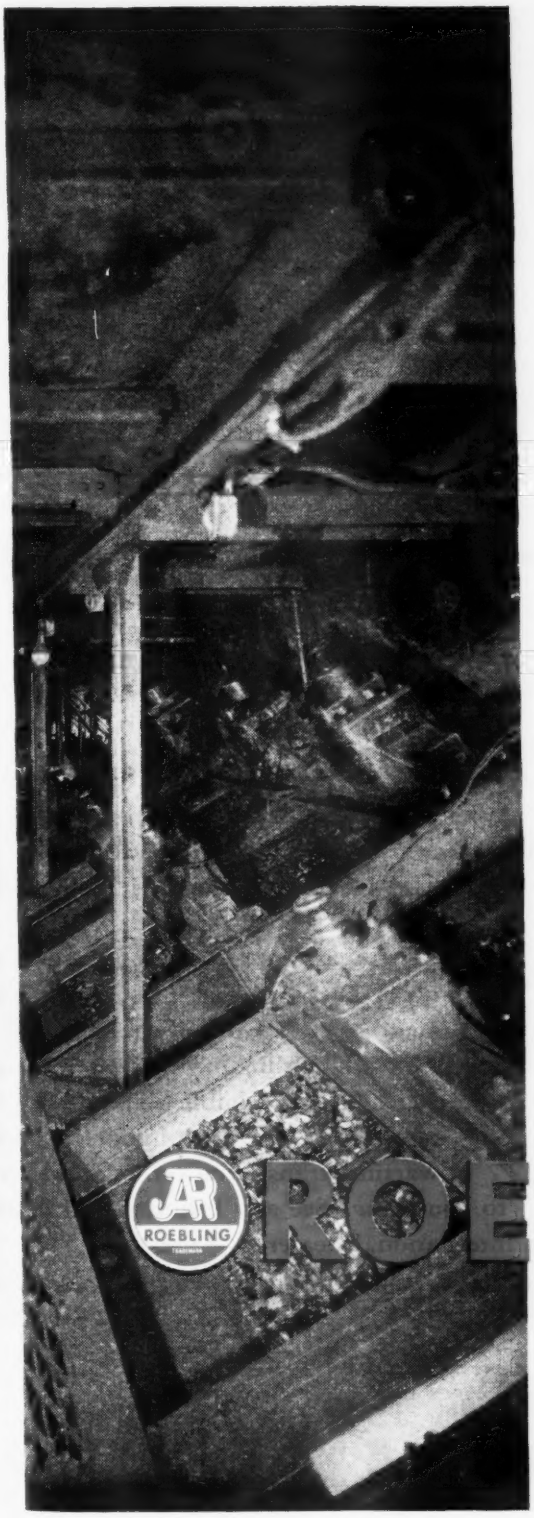


CRANE

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

Tomorrow's Mines will *Modernize* Electrically

. . . TO IMPROVE QUALITY . . . GET MAXIMUM UNIFORMITY OF IMPURITY CONTENT AND SIZING!



YESTERDAY'S method's of coal preparation are obsolete today. And in the post-war world new mechanical equipment for crushing, sizing, washing or cleaning will better the quality of the coal produced . . . will better the competitive position of mines that install it.

If you are interested in adopting the newest electrical methods of surface preparation . . . in getting maximum return from equipment investment and manhours of labor . . . and if you are interested in recovering the maximum profitable tonnage of salable coal . . . there's an engineer you should contact. He's . . .

YOUR *UTILITY'S* ENGINEER

There's an engineer on your local power company's payroll who is *at your service!* He has at his finger-tips suggestions that may lead to immediate *no-cost* improvements in your surface preparation methods. Or ideas that will result in better ventilation, more satisfactory pumping, savings in line voltage maintenance. He'll match his time with yours *without obligation.* Get in touch with him soon.

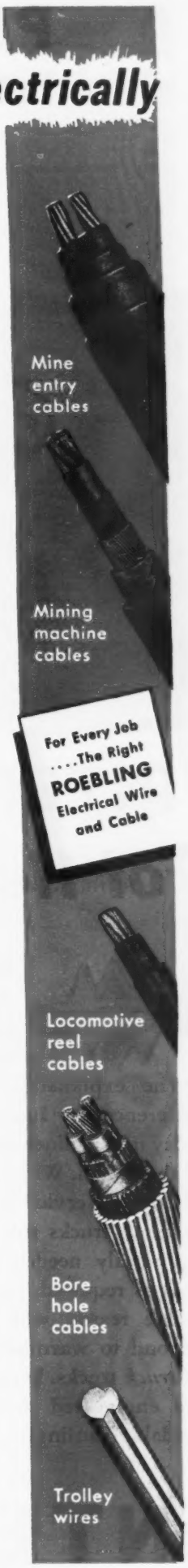
With the dawn of Victory, materials will again be available. And that's the time to remember that Roebling specializes in wire. Ready to provide the *right* conductor for *every* job.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

ROEBLING

PACEMAKER IN WIRE PRODUCTS

Wire Rope and Strand • Fittings • Cold Rolled Strip • High and Low Carbon Acid and Basic Open Hearth Steels • Aircord, Swaged Terminals and Assemblies • Round and Shaped Wire • Wire Cloth and Netting • Electrical Wires and Cables • Suspension Bridges and Cableways • Aerial Wire Rope Systems


Mine entry cables
Mining machine cables
For Every Job ....The Right ROEBLING Electrical Wire and Cable
Locomotive reel cables
Bore hole cables
Trolley wires

PRODUCTS OF THE MINES
TO WAR ON TIME

INTERNATIONALS—*First Choice of Heavy-Duty Truck Operators*

More Heavy-Duty International Trucks were sold in the ten years before the war than any other make of heavy-duty truck.

The explanation of truck operators' preference for Internationals is found today in the mines and on the highways of the nation. With thousands of miles of dogged service behind them, International Trucks roll on and on, moving vitally needed mine products on time as required.

One reason why Internationals stoutly respond to wartime demands is that they are *all-truck* trucks. Every part and assembly is designed and engineered to give efficient, economical, dependable hauling.

NEW TRUCKS *NOW!*

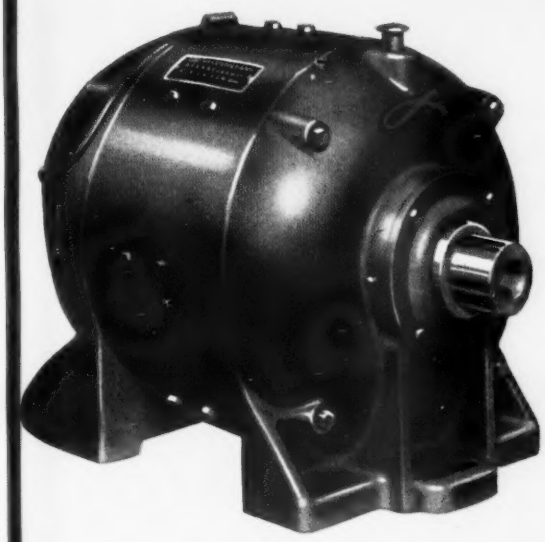
The government has authorized the manufacture of a limited quantity of trucks for essential civilian hauling. International is building them in medium-duty and heavy-duty sizes. See your International Dealer or Branch now, and get valuable help in making out your application. Don't delay!

Another reason is International Truck Service, furnished by 250 International Truck branches—the nation's largest Company-owned truck service organization—and more than 4,500 International Truck dealers.

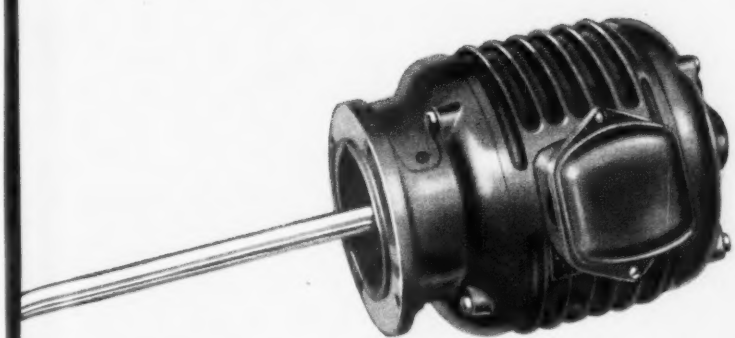
This wartime service is geared to the job of keeping trucks, no matter what make or model, out of the shop and on the road, hauling pay-loads. It finds and corrects little troubles before they become big ones. It is an important factor in wartime transportation. It is available to you—*now!* See any International branch or International dealer.

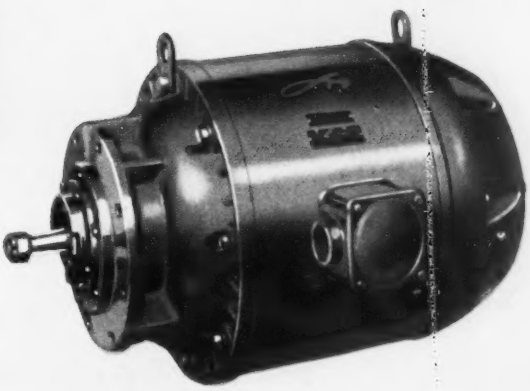
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL *Trucks*



There is a size and type LOUIS ALLIS electric motor for every industrial requirement.





THE LOUIS ALLIS CO., MILWAUKEE 7, WIS.

R.P.M. and H.P. alone won't do!

If you are planning a new product that will require a special electric motor in its construction, our engineering development department will welcome the opportunity of working with you.

For over forty years we have been developing special motors for special jobs — and during the recent years many outstanding improvements in electric motor design, construction and performance have been created by us — motors that are playing an important role in helping win the war.

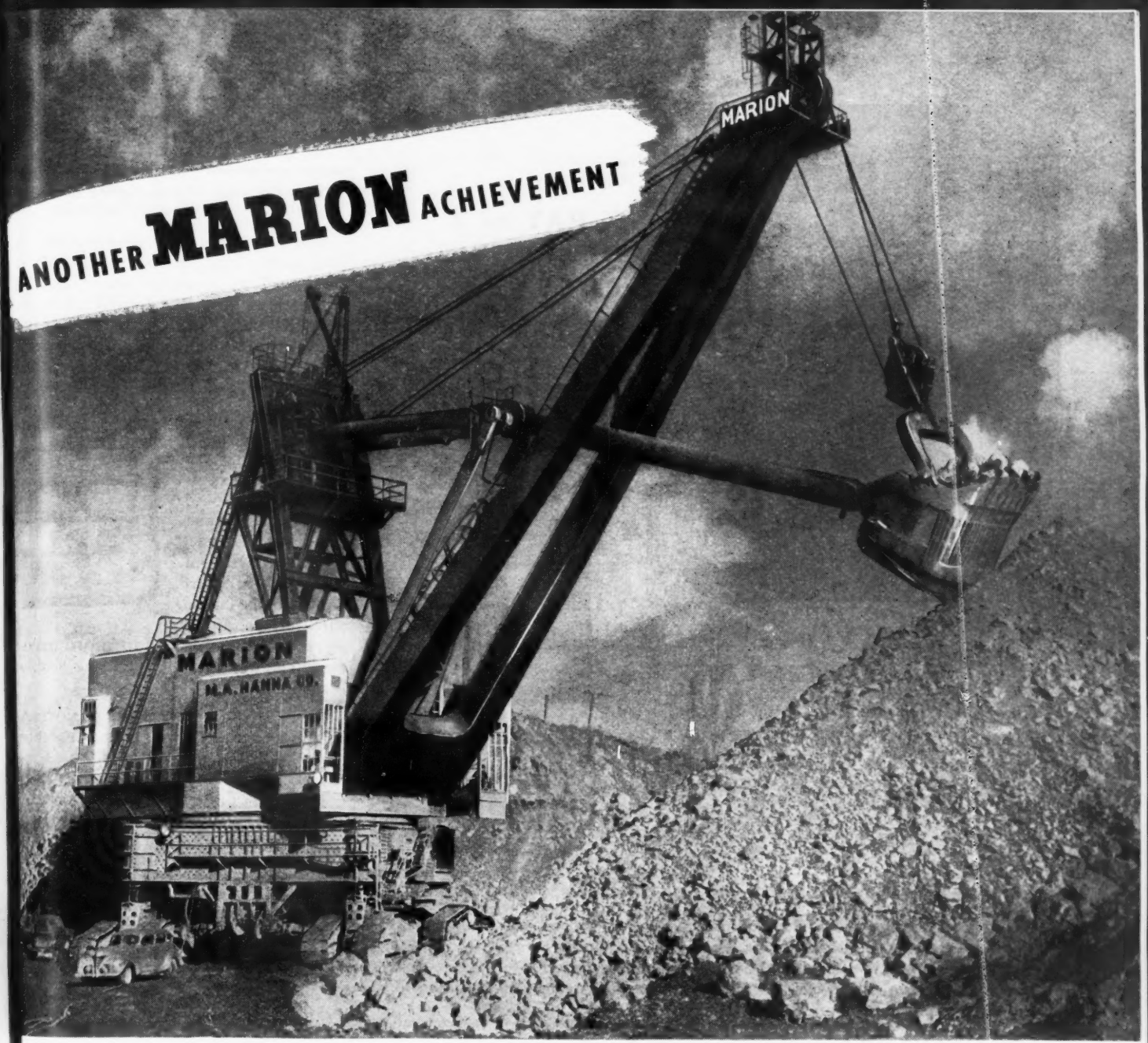
Many of these new motor developments will be available for general industrial use after final victory.

* * *

Machinery designers no longer attempt to use a standard motor for a special job — it is much more economical and efficient to obtain a motor with exactly the electrical and mechanical characteristics required to perform a specific job than it is to try to doctor up a standard "shelf" motor to do the job.

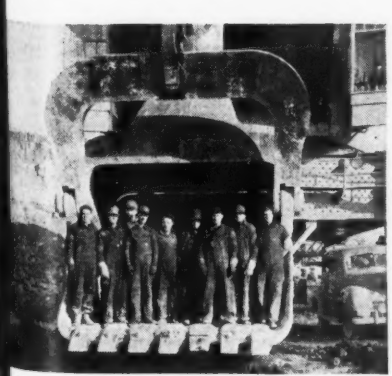
No matter what your electric motor requirements are — we will welcome the opportunity of serving you — your needs will receive our most prompt and careful attention in every way.

THE LOUIS ALLIS CO., MILWAUKEE 7, WIS.



WORLD'S LARGEST COAL STRIPPER

DIGGING 52½ TONS OF ROCK AND DIRT AT EVERY BITE



...e 35 cubic yard capacity dipper will dig 52½ ...s of material at every bite. This photo gives ...e idea of its enormous size.

EARLY this year the world's largest power shovel went into action. It was built by MARION for M. A. Hanna Company, and is stripping overburden on its coal properties near Georgetown, Ohio. Here the overburden ranges from 25 feet to 75 feet in depth.

Some idea of the size of this machine is gathered from the following comparisons:

Two dipperfuls fill a regular railroad car to overflowing.

One dipperful will fill a room 9 feet by 12 feet by 9 feet.

The electric power required to operate this huge MARION would serve a community of 3,000 people with all of its power needs.

The machine weighs 3,200,000 pounds, or 1,600 tons. It required 50 railroad cars to ship.

In 1943 about 83 million tons of coal were mined by the strip method with MARION machines of every description handling the major share.

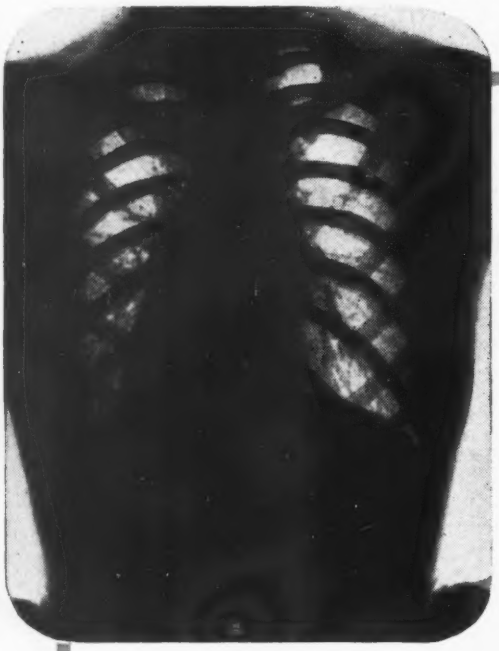
What is your postwar problem?

THE MARION STEAM SHOVEL COMPANY
Marion, Ohio, U.S.A.

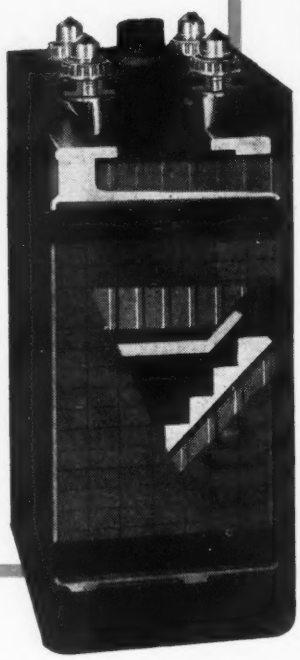
CRANES • PULL-SHOVELS
CLAMSHELLS • SHOVELS
DRAGLINES • WALKERS

For Every Material Handling Job
3/4 cu. yd. to 35 cu. yds.

BUY WAR BONDS



X-RAY of a HEALTHY CHEST



X-RAY VIEW of a SOUND BATTERY

While we do not X-ray storage batteries, we know they were "born" healthy if they are Gould.

Suppose you could make an X-ray of a Gould battery.

You would see special Gould features, developed through half a century of experience and research... for example, the Kathanode grid with its reinforced box-type structure locking the active material in place. This material, known as Gould Black Oxide, has a regenerative quality due to the pure lead core in each grain.

You would see each plate protected by spun glass mats of exclusive Gould design. This reduces shedding so that even after long service a minimum of spent active material is deposited in the bottom of the cell.

Gould knows that a well cared for battery is a healthy battery. To assist battery users in the solution of problems, complete Gould Service is available throughout the country.

Write Dept. 98 for Bulletin 100 on Gould Kathanode Glassklad Batteries for Industrial Trucks and Tractors.

GOULD STORAGE BATTERY CORPORATION *DEPEW, N. Y.*

Factories: Atlanta • Chicago • Dallas • Depew • Leavenworth • Los Angeles • North Bergen • Rock Island St. Paul • Sioux City • Zanesville

FOR EXCELLENCE IN STORAGE BATTERY PRODUCTION AT DEPEW PLANT

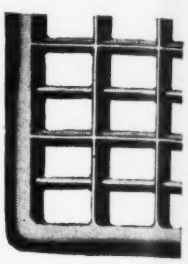
GOULD

Since 1898 **THE BATTERY PICKED BY ENGINEERS**

THE KATHANODE GRID

One of a series of informative articles for uses of industrial batteries

Each battery part is essential to successful, long-life operation. It is vital to have an active material with a full, long life, like Gould's famous Black Oxide. Yet, it is just as vital to pack that material into a grid having an equally long life. Otherwise, the grid would fail before the material.



The scientific method by which Gould grids are made is an example of why Gould batteries last longer. Gould grids are cast from pure antimonial lead carefully alloyed to avoid stresses and strain and to afford maximum rigidity against buckling and to retard plate growth.

The casting operation is performed by modern machines which automatically ladle the molten lead, the temperature of which is thermostatically controlled, into a precision water cooled mold. This close control prevents the formation in the grid structure of blow holes, and thus eliminates accelerated grid deterioration.

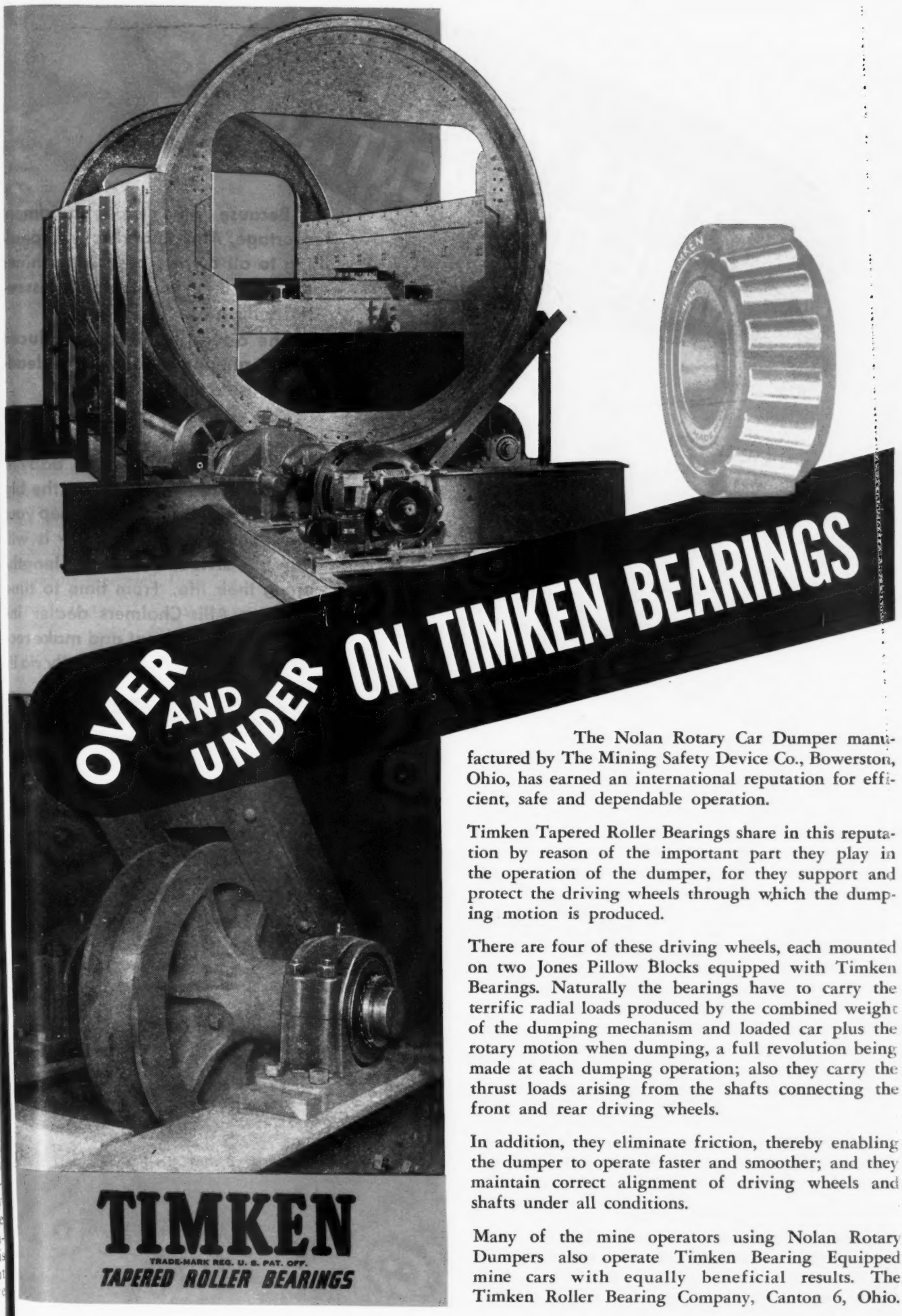
To assure perfect grids, an electrically operated device stops the machine and signals the operator should a faulty grid be cast. The finished casting is an ideal grid framework, a sturdy backbone for a sturdy battery.

What are the special features of the Gould positive grid?

The vertical and horizontal members of the grid are diamond shaped. In addition, vertical members are increased in cross-section as they approach the top of the grid. This assures adequate conductivity.

This diamond, or double wedge design, forms a series of box-like structures which with the addition of a round central horizontal member alternating with the wedge-shaped horizontal member makes it impossible for the active material to move in any direction within the box.

In addition, the round member acts as a reinforcing bar and because it is smaller in cross-section than the diamond shaped bars, it is completely imbedded in the active material, safe from peroxidization—certain to maintain its current carrying ability. This point is one of the most important factors in making the Gould positive grid an indestructible conductor.



The Nolan Rotary Car Dumper manufactured by The Mining Safety Device Co., Bowerston, Ohio, has earned an international reputation for efficient, safe and dependable operation.

Timken Tapered Roller Bearings share in this reputation by reason of the important part they play in the operation of the dumper, for they support and protect the driving wheels through which the dumping motion is produced.

There are four of these driving wheels, each mounted on two Jones Pillow Blocks equipped with Timken Bearings. Naturally the bearings have to carry the terrific radial loads produced by the combined weight of the dumping mechanism and loaded car plus the rotary motion when dumping, a full revolution being made at each dumping operation; also they carry the thrust loads arising from the shafts connecting the front and rear driving wheels.

In addition, they eliminate friction, thereby enabling the dumper to operate faster and smoother; and they maintain correct alignment of driving wheels and shafts under all conditions.

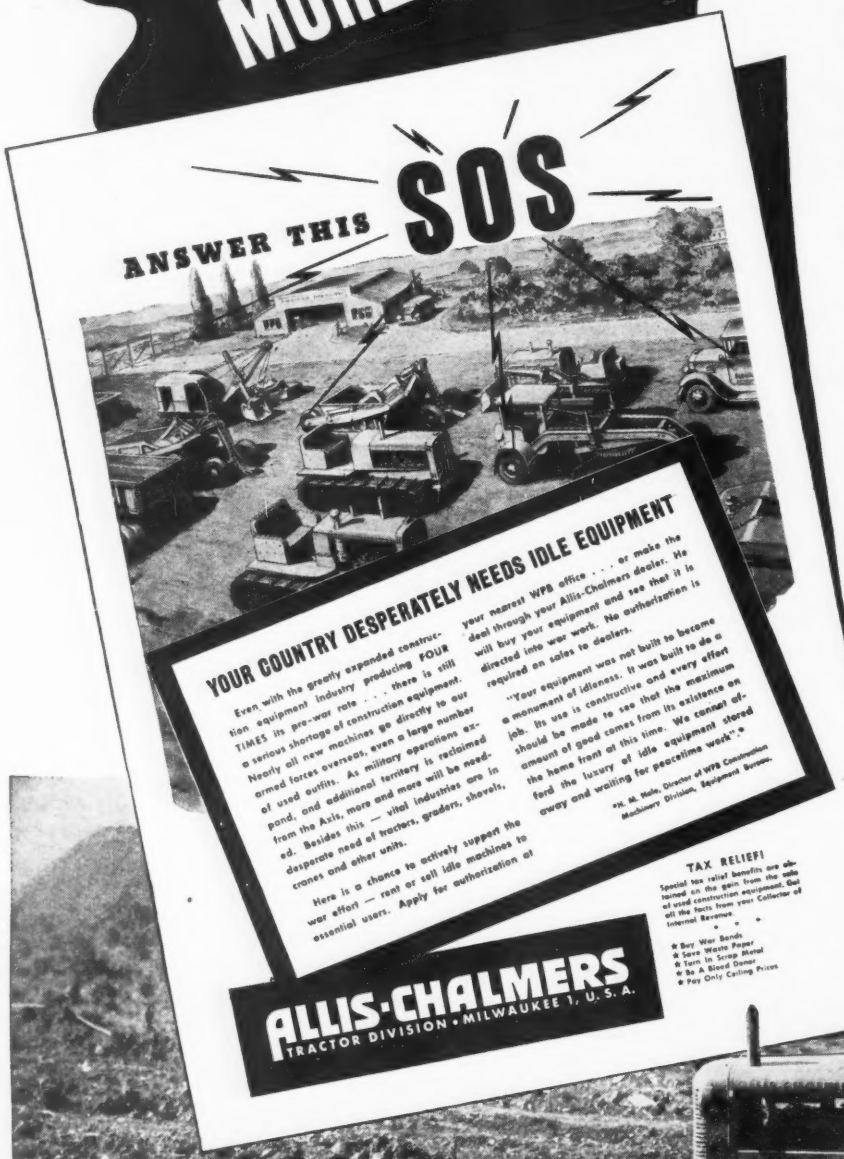
Many of the mine operators using Nolan Rotary Dumpers also operate Timken Bearing Equipped mine cars with equally beneficial results. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

TO HELP YOU GET MORE EQUIPMENT...

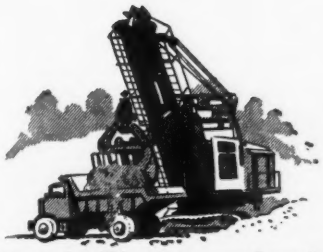

ANSWER THIS SOS
YOUR COUNTRY DESPERATELY NEEDS IDLE EQUIPMENT
Even with the greatly expanded construction equipment industry producing FOUR TIMES its pre-war rate . . . there is still a serious shortage of construction equipment. Nearly all new machines go directly to our armed forces overseas, even a large number of used outfits. As military operations expand, and additional territory is reclaimed from the Axis, more and more will be needed. Besides this — vital industries are in desperate need of tractors, graders, shovels, cranes and other units.
Here is a chance to actively support the war effort — rent or sell idle machines to essential users. Apply for authorization at your nearest WPB office . . . or make the deal through your Allis-Chalmers dealer. He will buy your equipment and see that it is directed into war work. No authorization is required on sales to dealers.
"Your equipment was not built to become a monument of idleness. It was built to do a job. Its use is constructive and every effort should be made to see that the maximum amount of good comes from its existence on the home front at this time. We cannot afford the luxury of idle equipment stored away and waiting for peacetime work." •H. M. Hale, Director of WPB Construction Machinery Division, Equipment Bureau.
TAX RELIEF!
Special tax relief benefits are obtained on the gain from the sale of used construction equipment. Get all the facts from your Collector of Internal Revenue.
★ Buy War Bonds
★ Save Waste Paper
★ Turn In Scrap Metal
★ Be A Blood Donor
★ Pay Only Ceiling Prices
ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Because of the serious equipment shortage, Allis-Chalmers is appealing to all owners of idle machines to make them available for essential industries.

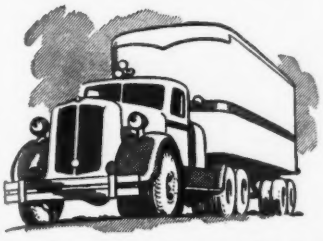
The advertisement reproduced here is running currently in all leading construction magazines.

You can help, too — by taking good care of your present equipment. You don't need to baby it — work it hard . . . to meet the big demand for vital ores. But keep your machines in good repair — it will pay big dividends, besides lengthening their life. From time to time let your Allis-Chalmers dealer inspect your equipment and make recommendations. He will gladly do it.

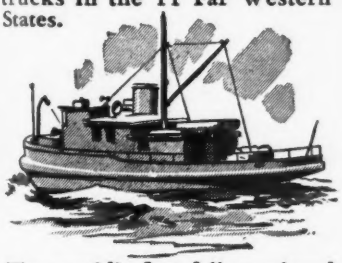
ALLIS-CHALMERS
Tractor Division — Milwaukee 1, U. S. A.



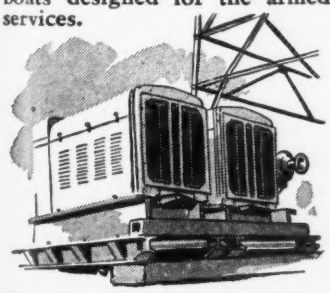
Cummins Diesel-powered trucks and shovels are a standard combination on major construction, material handling, metallic and non-metallic mining jobs. On the Mesabi Range, for instance, 30 to 40% of the total iron ore output is hauled by truck—the majority of them Cummins-powered.



Late in 1932, the world's first heavy-duty, diesel-powered freight truck went into service. The engine was a Cummins Diesel. Today, Cummins Diesels power approximately 90% of all franchise-operated, long-line, heavy-duty, diesel-powered trucks in the 11 Far Western States.



The world's first fully enclosed type marine diesel—now an accepted feature of marine engine design—was built by Cummins in 1928. Cummins Marine Diesels power fishing boats, work boats, pleasure craft and, today, many boats designed for the armed services.

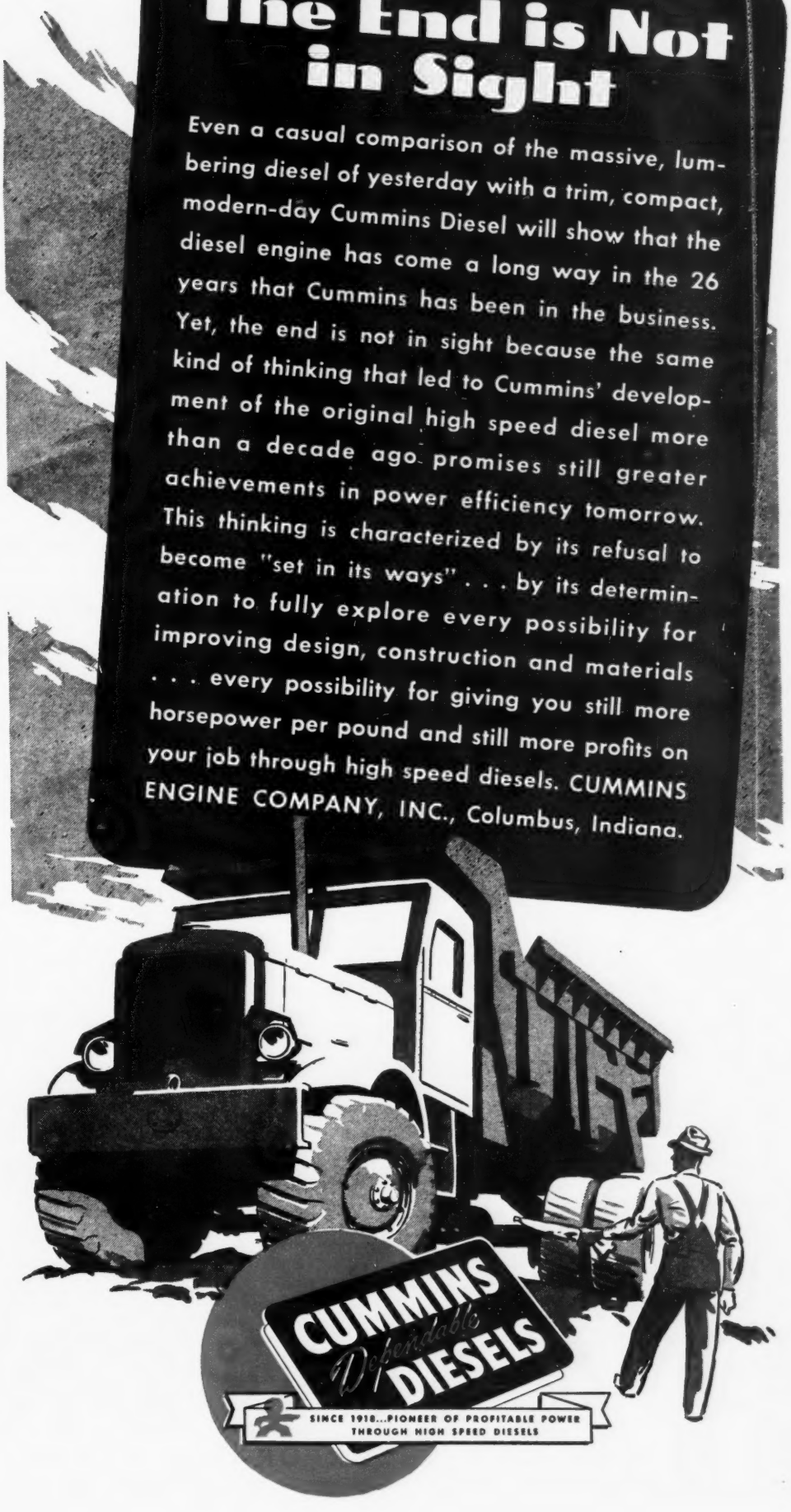


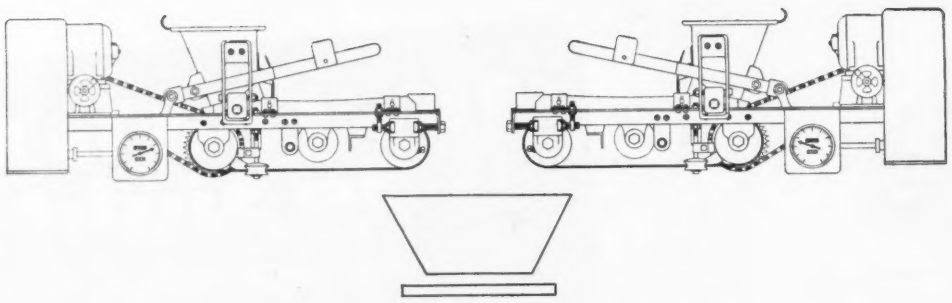
Four Cummins Diesels, three of them seven years old, powered the rig which this year drilled the world's deepest oil well. In this and many other heavy-duty services—logging, construction, and material handling—Cummins Diesels draw the *tough* jobs.

Automotive models • marine engines for propulsion and auxiliary power • power units of all types • stationary engines • generating sets locomotive models

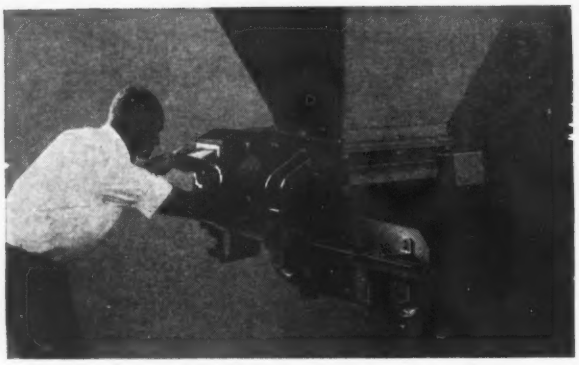
The End is Not in Sight

Even a casual comparison of the massive, lumbering diesel of yesterday with a trim, compact, modern-day Cummins Diesel will show that the diesel engine has come a long way in the 26 years that Cummins has been in the business. Yet, the end is not in sight because the same kind of thinking that led to Cummins' development of the original high speed diesel more than a decade ago promises still greater achievements in power efficiency tomorrow. This thinking is characterized by its refusal to become "set in its ways" . . . by its determination to fully explore every possibility for improving design, construction and materials . . . every possibility for giving you still more horsepower per pound and still more profits on your job through high speed diesels. CUMMINS ENGINE COMPANY, INC., Columbus, Indiana.





BLENDING COAL



Hardinge Equipment

	Bulletin No.
Agitators	31-C
Clarifiers	31-C
Classifiers, Air	17-B
Classifiers, Counter-Current	39-A
Classifiers, Hydro	31-C
Density Stabilizer	42
Digesters	36
Dryers	16-C
"Electric Ear"	42
Feeders, Belt	33-C
Feeders, Constant Weight	33-C
Feeders, Disc	33-C
Feeders, Drum	33-C
Feeders, Non-Flooding	33-C
"Feedometers"	43
Filters, Sand	30-A
Metal Reclamation	8-A
Mills, Batch	19-A
Mills, Conical Ball	13-D
Mills, Conical Pebble	13-D
Mills, Rod	25-B
Mills, Tube	18-A
Mixers, Slurry	31-C
Pumps, Diaphragm	32
"Ruggles-Coles" Dryers	16-C
Kilns and Coolers	16-C
Scrubbers, Conical	37
"Thermomill"	17-B
Thickeners	31-C

The Hardinge Weight Recording Feeder for blending two or more kinds of coal, records the total weight fed.

A visual meter reading in pounds or tons totalizes the weight fed. When a record of the weights is desired the feeder is equipped with a printing attachment to record the batch weight or the cumulative weight.

BULLETINS 33-C and 43

HARDINGE

COMPANY, INCORPORATED - YORK, PENNSYLVANIA

New York, 122 East 42nd Street Chicago, 205 West Wacker Drive San Francisco, 501 Howard Street Toronto, 200 Bay Street

HAUL BIGGER LOADS

-AT A PROFIT!

With your coal pits expanding under record war demands, and runs to the tipple getting longer, the answer lies in hauling much larger tonnage per trip. Using Walter Tractor Trucks, you can haul 60 tons in two trailer units or 30 tons in a single trailer unit, at sustained high speeds under all conditions, without damaging road systems.

Full power of the 300 h. p. motor is smoothly transmitted to the road by the exclusive Four-Point Positive Drive. Wheel slippage is prevented by Automatic Locking Differentials which proportion the torque to the four driving wheels according to the traction of each wheel at any instant. This perfectly balanced combination of power and traction keeps huge loads moving over soft ground, mud, slippery surfaces and steep grades.

Walter Tractor Trucks embody other features, such as Suspended Double Reduction Drive for less unsprung weight, higher ground clearance and better road contact, thus less tire wear; rugged tractor type transmission; cab forward design for shorter wheelbase and easier maneuvering. Complete engineering details and engineering data sent on request.

DELIVERIES ARE NOW BEING MADE

on Walter Tractor Trucks for essential civilian use. The War Production Board has authorized the production of various models in addition to the military requirements.

WALTER MOTOR TRUCK CO., 1001-19 Irving Ave. Ridgewood 27, Queens, L.I., N.Y.

WALTER TRACTOR TRUCKS

● *Built by* GOODMAN MFG. CO.

Mining job for SKF's

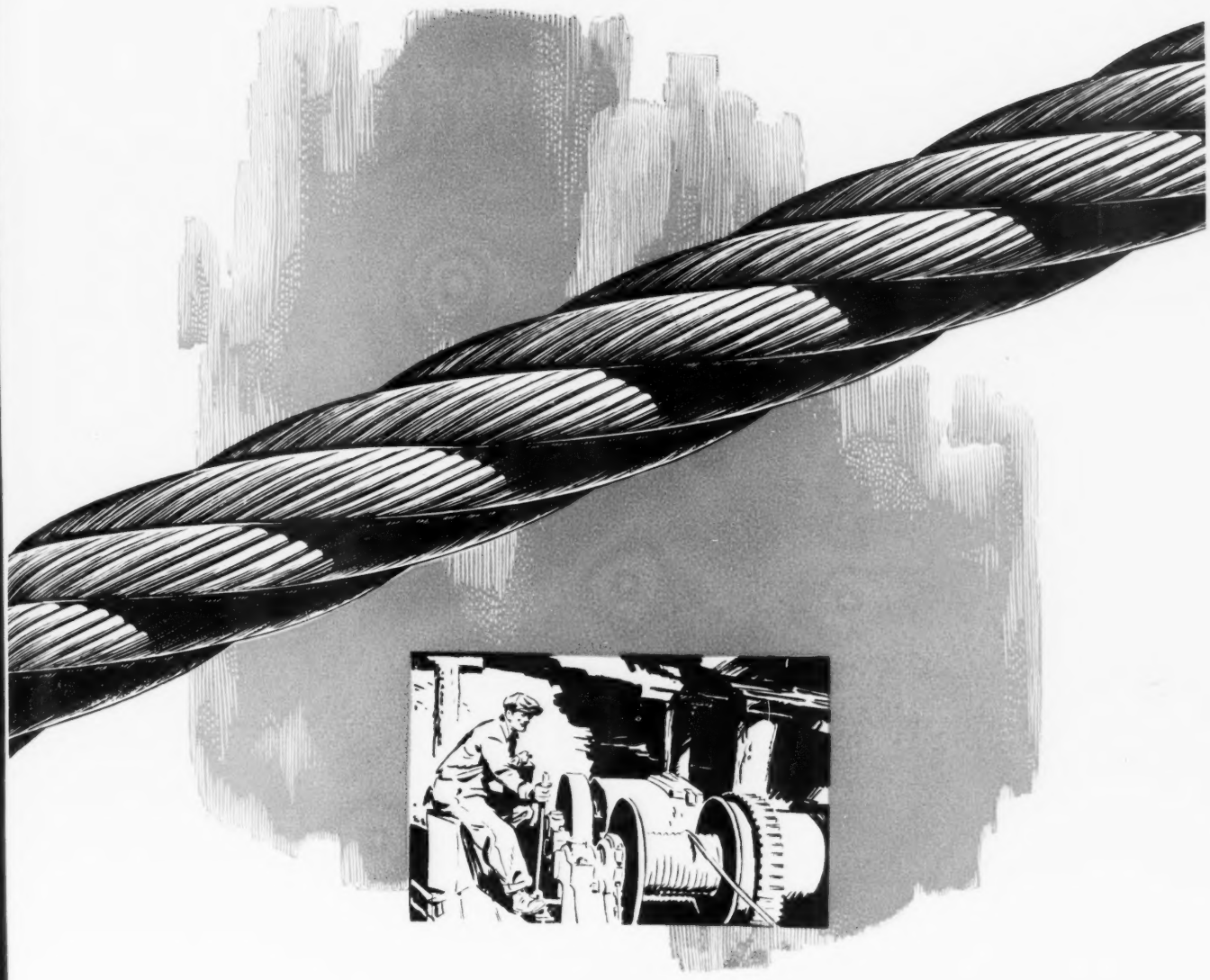
SKF

BALL AND ROLLER BEARINGS

The picture of this Coal Loader entering a fall of coal is a picture of SKF Ball Bearings in action. Of course, you can't *see* these bearings, for they control the movement of the chain conveyor head and tail shafts of this loader. But you know they're there from the ease and speed with which this machine picks up large quantities of loose coal and hurries it into the car.

Shafts work smoothly and continuously when SKF's are around them. Radial and thrust loads come and go, but SKF's never bind. No time-and-labor-consuming adjustments are required, and attention is reduced to infrequent lubrication. In the speeding up of coal for America's furnaces and by-products, therefore, SKF Bearings play a leading role. 5616

SKF INDUSTRIES, INC. • FRONT ST. & ERIE AVE. • PHILADELPHIA 34, PA.



THERE are still some people who confuse the COST of a cable with its PRICE . . . The price is patent when you buy it . . . But the cost cannot be computed until you scrap it . . . measure the term of usage, work done, service secured, against the original price paid . . . We put so much into Rochester ropes that their prices never scrape the bottom . . . but, for the same reason, their costs often do! . . . Pick the right rope for the job, pick Rochester—and the results will re-sell Rochester every time! . . . At present, priorities restrict our distribution . . . but when restrictions are removed, you can again rely on Rochester for the best in wire rope.

ROCHESTER *Ropes*

JAMAICA, NEW YORK • CULPEPER, VIRGINIA

Culpeper, Va., and Jamaica, N. Y., plants

Most mining operations are similar . . . and that is why the same types of Joy Equipment are being adapted for use in practically all types of mines. Below we give a few examples.

Works above ground as well as below

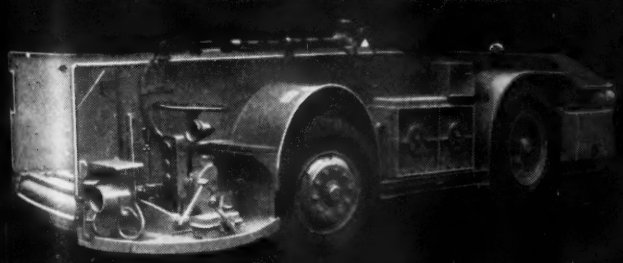
Wherever ore, rock or coal needs to be loaded, Joy Loaders will do the job speedily. Their use is not limited to underground operations, for they work equally well in surface strip mines or loading at stockpiles.

Joy mechanized mining equipment is versatile!

Driven by heavy-duty batteries

In coal mines particularly, where danger of a spark is ever present, Joy Shuttle Cars, battery operated, can do wonders to speed up production. Here is a 42" Joy Shuttle Car being loaded by a Joy 7 Bu. Loader.

Combination cable reel and trolley shuttle car



This Joy 42" Shuttle Car gives section haulage to the main trolley track by means of the self-winding cable reel. The cable can be detached and the remainder of the trip accomplished from the trolley wire power.

JOY MANUFACTURING CO., FRANKLIN, PA. *Consult a Joy Engineer*

Consider the Advantages of
ORANGE WAX CLOVER BRAND

Durable, flexible, unusually resistant to moisture penetration, burning with very little smoke and comparatively free from side spitting, Clover Brand Safety Fuse was a strong favorite for underground work for many years prior to 1933.

In that year this famous brand was made available with an *orange wax* finish, which protects the outside countering threads, preventing moisture absorption . . . affords a smooth, yielding crimping surface which provides a better waterproof joint between cap and fuse . . . gives better visibility in underground work . . . makes for even greater regularity in burning.

With all of these advantages it is not surprising that *Orange Wax* Clover Brand Safety Fuse has grown steadily in popularity. Perhaps it is the brand *best suited* for your work. The Explosives Company supplying your requirements will be glad to discuss this subject with you or write us.

Are you using the brand of Ensign-Bickford Safety Fuse best suited for your work? For instance:

If you have . . .	*and now use . . .*	*we suggest*
Very wet work	Double Tape Single Tape White Clover Beaver	Orange Wax Clover
Very wet work	Crescent	This is O.K.
Very wet work	Gray Charter Oak	Black Wax Charter Oak
Damp work	White Charter Oak	This is O.K.

16

ENSIGN-BICKFORD *Safety Fuse*

SINCE 1836
Also Primacord-Bickford Detonating Fuse

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, *Editor* **August, 1944**

One Hurt, All Hurt

WHILE not yet honored to the extent that it might be, the conviction is rapidly growing that what hurts one party in coal mining hurts all; contrariwise, that what helps one helps all. That principle, of course, is being extended, as it should, to take in coal's customers and the public in general, because failures in service to those customers and the public have a distressing tendency to rebound on coal to the injury of every man and every investor in it.

What hurts the public and consequently coal? One thing—and a big thing—is stoppages, regardless of how they arise. The four that occurred in 1943, again regardless of cause, can hardly be described as benefiting coal. Now, it is not so long until a new contract will come up. Will it again require one or more cessations in operation and the intervention of the government to finally work out a new agreement and get it signed?

The answer is a clear-cut understanding of fundamental rights, which will head off stoppages growing out of attempts to invade those rights, such as collective bargaining on the one hand and management of the mines on the other, supplemented by a joint arrangement that will insure settlement of other issues without work interruptions. True, it will require some revision in both thinking and practice, but the rewards are great and the problem undoubtedly is susceptible of reasonable solution.

Some have said that coal-mining agreements should permit making firm sales contracts for ten years or more with a bond that deliveries will not be interrupted. The more this and kindred proposals are examined, the more attractive they appear when it is realized how much damage unnecessary stoppages have caused in the past. Both miners and operators would benefit and for both this question should rank high on their agendas in preparing for the next wage negotiations.

Not Yet Time

UNDUE optimism can be a real handicap in the vital task of solving the nation's immediate fuel problems. Maximum production of coal is the biggest single factor in the solution. Cooperation of the consumer in taking available supplies and in using coal with maximum economy is the second. Undue optimism that is reflected in slackening at the mines or in an idea among consumers that there is nothing to worry about might bring on a real crisis in supply and the institution of really rigid controls in case hostilities go on for any length of time—and there is no sign as yet that the enemy will give up easily on any of the fronts on which we are engaged around the world.

Perhaps the war will end tomorrow. But the services, while quietly confident, are not counting on such a desirable eventuality. Until they let up, neither can the nation's producers. By producing, by promoting conservation, by making sure that undue optimism does not rob the country of the full benefits of both while they still are necessary, coal can render a real service to the war effort and at the same time avoid a possible black eye, which would be the inevitable result in case a shortage should occur because the pressure was relaxed too soon.

Preventive Ounce

ELECTRICITY must be handled as cautiously in and around a coal mine as in and around any other industrial plant. Circumstances make it harder to watch in mines, but nevertheless it must be done.

In the underground distribution systems of today's mechanized mines, control and protection of electricity, so vital to trouble-free operation, are too often lacking. Power-supplying units, such as converters, m.g. sets and rectifiers, are found solidly interconnected and feeding single extensive networks of bare conductors and insulated cables. These units stand ready to feed any load, whether it be proper—coal production—or illegitimate—shorts or grounds that could lead to accidental mine fires with their accompanying loss of life and property.

To protect such systems requires planning. It means adequate protection at each of the power-supplying units (which should be part of the units as manufactured); due care that the protection provided does not interfere unwisely with the natural course of coal production; and maximum reduction or elimination of hazards to life and property. The answers to the last two problems, particularly, can be found in two words: "engineered sectionalization." Sectionalization merits wider—much wider—use. It can be made to protect production, life and property—all at the same time.

The Mine Boss

Vital Factor in Management

The mine boss performs one of the most important functions in management. But how does he look at his job and his place in the organization? And how do his superiors regard him and his work? Every step toward real teamwork means increased rewards to management, men, stockholders and customers.

PRODUCTION is not alone manpower and equipment. It also requires intelligent direction—another term for management. Direction, or management, heads up in the operator in coal mining, but the mine boss is a vital part of the management set-up and has corresponding duties and responsibilities. Logically—and management experts are unanimous in this—the other elements in management have, in turn, equally grave responsibilities to the boss. The job is one of teamwork and only by assuring the maximum in that teamwork can the maximum in benefits to all be assured.

While the operator theoretically is responsible for each and every detail of the conduct of his company's affairs, it manifestly is impossible for him to be everywhere at all times to handle personally all matters down to and including, for example, telling a machineman where to cut. Authority therefore must be delegated from, say, board of directors to president to vice-president to general manager to superintendents to mine foremen to face bosses, each exercising in requisite degree the power of direction, or management, as well as discharging the duties required of operators and management by law and union agreement.

To put the matter another way, the magnitude, scope and area covered and the functions performed daily in a coal mine require the delegation of the operator's responsibilities, duties, obligations and powers to a sufficient number of men to carry out all of them immediately as though he were present to make each decision and issue directions. Thus, every face boss who tells a machineman where to cut, for example, is exercising the powers of decision and intelligent direction which are the essence of management.

Teamwork the Thing

A man who takes a bossing job in a coal mine therefore becomes a part of management. In accepting the rewards of this status that same man also accepts the responsibilities. He cannot set himself apart from the team for several reasons. If he does, he makes it difficult or impossible for management to perform the function of intelligent direction so necessary to enable manpower and equipment to produce the maximum results for workers, for management itself, for the people who have invested in the company and for its customers, who want low cost and quality.

There is a second and more personal aspect to the question of the boss's idea of his role in management. Efficient management plus efficient manpower mean, under the American system, efficient production and low cost, with greater rewards to all. The more a boss contributes to efficient management, the more he can expect as his share of the over-all results in the form of greater income and faster advancement, plus the satisfaction of making it possible for his men to earn more and for the investors in his company, who made his job possible, to receive a fair return on their money, in addition to the benefits to himself and his industry inherent in making better, lower-cost coal available to existing and potential consumers.

The Miner's View

At this point it might also be pertinent to look at the boss's position through other eyes—those of the miner. To the miner, the boss is management and he judges management and company policies largely on the basis of his relations with his boss, since that normally is his only contact with management. The miner also is a good judge of management—particularly management as epitomized by his immediate superior. It is safe to

THIS IS THE MINE BOSS

His Goal: Doing a better job, by:

★ Accepting his responsibilities as a full-fledged member of the management team.

★ Exercising his authority only within defined limits, which he seeks to have established if not already so, and in a manner fair to both the company and his men.

★ Keeping abreast of mining progress and methods of promoting safe, efficient operation.

★ Contributing the results of his study and experience for the benefit of the entire organization—men, management and stockholders—and its customers.

His Need: Maximum cooperation from the rest of management, in:

★ Full appreciation of his status, with pay, treatment and privileges to correspond.

★ Clear definition of his responsibilities, with authority and backing as necessary to carrying them out.

★ Real help in attaining greater proficiency in his work.

★ Workable provisions for quick communication and exchange of ideas.

say that the miner rates his boss, consciously or unconsciously, on the qualities long accepted as the foundations of good management: understanding of the job, requisite authority rightfully exercised and a recognized position as a member of an efficient, smooth-working team. In other words, the miner knows when direction, or management, is intelligent and efficient and when it is not and, given his choice, he would prefer good management to indifferent or bad management.

Since the boss normally is management's principal or only contact with its working force and since it is he who finally puts the company's policies into effect and sets the final cost of the product by how well or how badly he directs the work of the men and equipment placed in his charge, how his job is viewed both by the boss himself and by the rest of management becomes a vital factor in the final results. Does the boss feel like a boss and do the other segments of management consider him a part of the team and treat him accordingly?

What the Boss Is

At the risk of repeating what perhaps already is well known, it might be helpful to outline just how much a part of management the boss or foreman in his normal every-day activities really is.

1. He is charged with the responsibility for getting out the coal—no little responsibility in itself, involving, as it does, control over thousands of dollars worth of equipment and the efficient use of a payroll also totaling thousands of dollars annually. But, important as that responsibility is, the boss also has others equally or more important.

2. He is legally responsible for carrying out the provisions of mining laws and regulations and insuring the safety of the men and property in his care.

3. He has the further responsibility of carrying out the terms of the wage contract, including making and checking contracts for thousands of dollars annually for deadwork and similar activities.

In other words, as previously stated, the boss is management at the face and on the surface.

He is, or should be, the explainer and upholder of management policies to the worker.

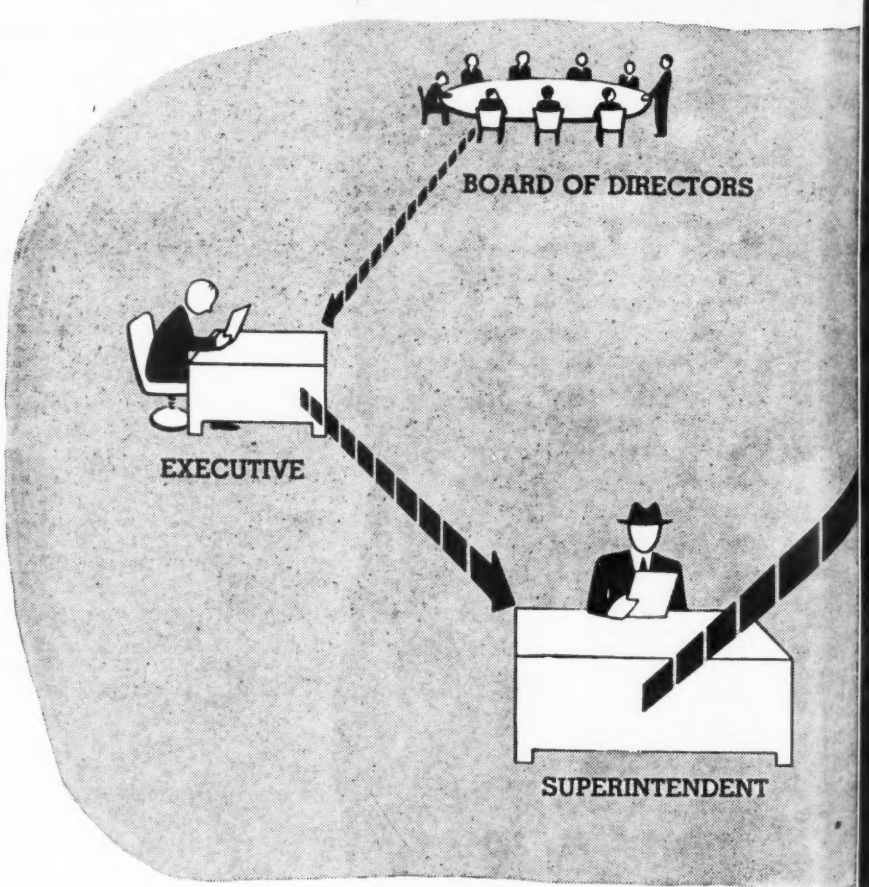
He is, or should be, the principal settler of grievances, since prompt, fair settlement of differences between workers and management has been found over and over to be the best method of heading off trouble in large quantities.

He is, or should be, not only the director but the counsellor and friend of his men, since both, after all, are working, in the broad sense, for the good of everybody in the industry.

He is, or should be, management's executor and administrator on the job.

In other words, the boss is not a valuable man to management. He is management.

The Mine Boss Is Management o



Statement of the self-evident fact, however, does not end the matter—not quite. Sober thought quickly shows that achieving the real teamwork that is the mark of good management requires study, thought and sincere effort toward discharging their respective responsibilities on the parts of both bosses and the other segments of management if the goal of maximum benefit to all is to be reached. Bosses must feel and act a part of management. They must strive to make themselves more proficient in their work not only for reasons of personal benefit but because, as they become better managers, their men, their company, their industry and their customers also benefit in corresponding measure.

In turn, the rest of management must consider the boss fully a part of the team and treat him accordingly. They should supply him with all the help, information and support he needs to do his work efficiently and should assist him to become more and more proficient as time goes on, rewarding him commensurately as his value to the company and to its employees, stockholders and customers increases.

The principles which should govern bosses and other segments of management in their mutual efforts are much the same in all industries, with some minor exceptions peculiar to each.

When they are recognized and fully honored by all the parties concerned, that mutuality of interest and effort and the benefits which flow from it are assured. Some of the principles and how they apply to bosses and higher officials in the management chain, as revealed in consultation with management experts, operators, labor relations experts, labor leaders, unbiased public opinion analysts and bosses themselves, are discussed below.

Duties and Responsibilities

It is assumed that every man who is made a boss in coal mining is understood both by himself and his superiors to be a boss and a part of management in the fullest sense of the word. If there is any doubt about it, it will be that much more difficult for both parties to function properly and the purpose of the arrangement may, in large measure, be defeated.

Make Duties Clear

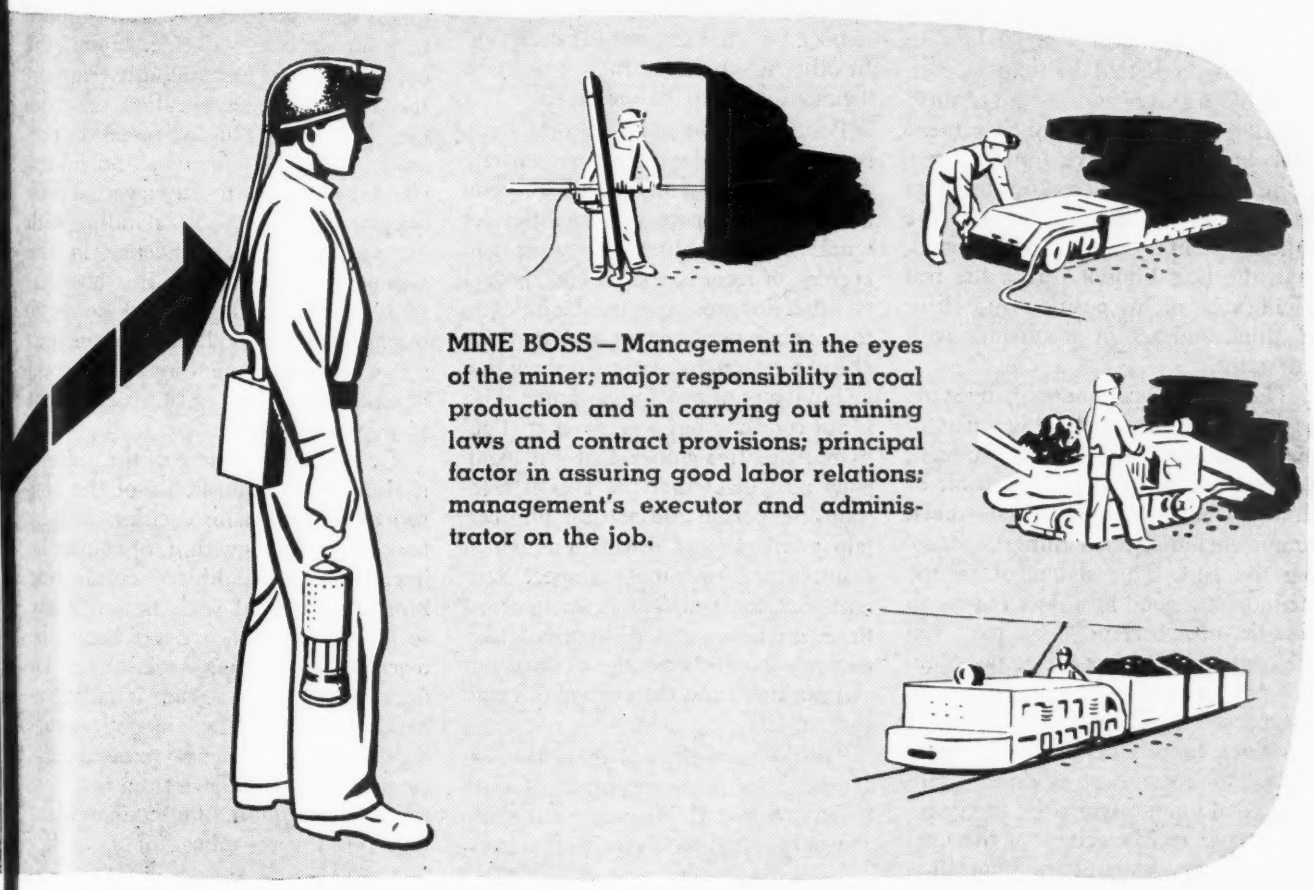
If it is clearly understood that advancement to a management status means that a man is boss and is to be treated accordingly, including enjoyment of all the privileges of office along with the responsibilities, the next step is a clear understanding of just what those responsibilities are. It is not drawing a clear-cut line that results in difficulties. Rather, trouble starts in the no-man's land created when responsibilities are not clearly defined. It includes failure to take action that should be taken and, contrariwise, overstepping the bounds of authority either ignorantly or because lack of definite understanding invites such overstepping.

What part does the boss play in hiring, firing, transfer, promotion, handling grievances and discipline? Is he to explain company policy or simply put it before his crew on a take-it or leave-it basis? What part is he to play in promoting their welfare and contentment on and off the job? Is he responsible for training and instruction (and how much)? Where do his safety responsibilities end and those of the safety department begin? How much leeway does he have in revising or altering working methods to meet changes in conditions? How far is he responsible for the care and maintenance of the equipment in his charge?

All these and other questions are potential sources of friction unless both boss and his superiors clearly understand what his responsibilities are. The more clearly they are defined—and, preferably, set down in black and white—the more efficiently the boss—and his superiors—can function.

But the job is not all one-sided. The boss also has a part to play in the

The Firing Line—Where Efficiency Is Gained or Lost



MINE BOSS—Management in the eyes of the miner; major responsibility in coal production and in carrying out mining laws and contract provisions; principal factor in assuring good labor relations; management's executor and administrator on the job.

matter of defining and accepting responsibility. He cannot stand passively by. He must take active steps when he succeeds to his job to familiarize himself with his duties and his responsibilities. Furthermore, he must keep abreast of changes as they are made and if, in his work, he discovers a need for revisions to increase efficiency and promote safety, it is to his interest to make sure that his recommendations go to the responsible superior for consideration and action. The boss must know company policy by heart and practice to become perfect in applying it in his relations with his men and the conduct of his daily work.

The topic of the job of the boss in helping define duties and responsibilities could be expanded indefinitely, but in the long run, once the limits are defined and the policies established, he must accept them wholeheartedly. In other words, he must become a member of the team in the fullest sense of the word if he is to do himself and his organization the most good.

Status and Authority

Granting that the boss is part of management, is it always made clear to him and to the men under him, in word and deed, that he holds a position of dignity and responsibility? Equally important, does management back him up and give him the requisite support so necessary for him to discharge his responsibilities to the fullest extent? On the other hand, does the boss himself realize the real significance of his position and strive to think and act in accordance with his status?

The average boss undoubtedly starts out with the idea that he is a part of management. If he carries through, he develops, as he must, the habit of thinking and acting as a boss down to and including such things as dressing the part. This statement of the attitude of a good boss does not mean that he must become "high hat." On the contrary. However, his responsibilities are greater and consequently he is expected, by his men as well as his superiors, to conduct himself accordingly. This requires no sacrifice of fairness, good humor, sympathy and genuine interest in the welfare of the men in his charge, while at the same time maintenance of the dignity of office enhances the boss's standing.

Aid in maintenance of the dignity of position also is a major responsibility of the remainder of management. The more a boss is made to feel a boss, which includes clear evidence of his status when he is dealing with employees—and his superiors—the better he can function as such. He must not be bypassed in favor of a direct approach to his men without compelling and previously understood reasons. Otherwise, it is impossible to insure respect for the boss and his decisions. In other words, his authority must be definite and must be preserved.

Position also is made up of a number of other things, such as separate change and bathhouse facilities; comfortable office space and facilities for quick, efficient filing of reports and keeping of records; special hats, badges or other insignia; parking facilities in the management section and anything else of a reasonable nature to show that he holds a position of importance. This is not coddling but a very material aid to morale. It signifies that the company recognizes that the boss is a responsible person and accords him certain privileges and distinctions which maintenance of proper respect warrant. But the fact that he is accorded these privileges and distinctions likewise lays on the boss the duty of not abusing them and thereby going "high hat" in fact.

To turn to another phase of the role of the boss in management, failure to equip him with the proper authority and define its limits can be the cause of more friction and inefficiency than practically any other one thing. How much authority the boss is to have is a matter for individual organizations to decide, but it certainly should be sufficient to permit him to do his job well. And the limits should be clearly defined and understood, both by the boss himself and by his superiors. If it is not made known to him at the time he takes his job and if he is not kept posted on revisions, the efficient foreman should take steps (1) to insure that he receive requisite authority; (2) that its limits be clearly defined; and (3) that he be kept posted on any changes that may be dictated by conditions. Once in that position, of course, the foreman should make sure that he stays within the limits, thus insuring a smooth-working set-up.

Authority, however, is not authority unless it is backed up. Whatever policy may be, once it is decided upon, the company must scrupulously support the boss in its application. A boss needs to have a decision based on policy and in line with what he understands to be his authority reversed only once or twice to lose his standing with his men and his confidence in the support of his superiors. If a boss has to be reversed, it should be done diplomatically and, if at all possible, in such a way that he does not lose the respect of either his fellows or of his crew, not to mention himself.

To look at the reverse of the picture, it also is the responsibility of the boss to make sure that his decisions will be backed up. Along with it, of course, he has the responsibility of conducting himself in accord with his authority so that he seldom or never has to be reversed. If frequent reversals of his decisions occur, he either is failing in his duties through lack of understanding of policy or is not receiving the support he should have from his superiors. The existence of either condition indicates the remedies.

Getting Better Results

The sincere and alert boss misses few opportunities for learning how to do his job better, with consequent benefit to himself as well as to his men, his company and his company's customers. With the rapid advances in the technology of mining, preparation and allied activities, and in methods of dealing with men, the good boss cannot afford to rest on his oars with the idea that what he already knows will serve him from now on. He must avail himself of all opportunities for learning afforded him by his company, as

well as by outside agencies. This is not as onerous a task as it might seem and keeping constantly abreast is not nearly as difficult as attempting to make up for long-continued lack of study of his job and how to do it better.

The sincere and alert company also appreciates the fact the boss can function more efficiently if he is kept abreast of thought and action in the industry, as well as the progress of his own organization. Telling a man he is boss and that henceforth it is solely up to him became outmoded long ago, to be succeeded by an active policy of assisting him to do a better job. What assistance is to be provided the boss is largely a matter for the individual organization. Some have gone as far as comprehensive training courses before the boss enters on his duties, with refresher sessions from time to time thereafter. Most certainly, he should be well grounded in operating methods and policy and should have a voice in the discussion preceding any changes.

Aside from training and assistance in the larger sense, helping a boss function more efficiently also includes a number of items such as keeping him supplied with up-to-date maps of his section, frequent reports on his costs—maintenance, supplies, production, etc., as conditions may warrant—with comparisons with those made by others, relative standings from the standpoints of tonnage and efficiency and any other data that will help him intelligently assay his results and take the necessary steps to make them better. A boss working in the dark and with too little data also works under a more or less severe handicap, depending upon conditions. Both he and his superiors should operate constantly on the theory that the more information that can be made available the more efficiently he can function.

Promoting Good Relations

If bosses are to function efficiently, experience has shown that channels of communication and exchange of information between them and the other segments of management must always be provided and must insure quick, conclusive discussion of mutual problems. Any barrier to free discussion and exchange of ideas militates against the smooth functioning of the team, promotes friction and handicaps both the boss and his superiors in attainment of the goal of maximum efficiency.

Take the case of a boss with an idea. If, inadvertently or otherwise, it is difficult for him to pass his idea on to his superiors, the company may lose the benefits of a real advance in operating efficiency, while the boss either goes elsewhere where his talents are more appreciated or decides to sit tight and mark time. Machinery for the prompt handling of suggestions from bosses should be a part of every management set-up and they should be encouraged to use it early and often. Then the alert boss will find it easier to do his part, which is to pass along everything that he feels will help promote efficiency, cut cost and increase safety.

Turning to another phase of the problem, it does a boss's prestige no good, for example, to read about a change of policy or methods on the bulletin board. Everything in company policy and operations—and perhaps finance—should be explained to every boss before it is announced to the men and the public. In fact, the usual procedure is to go even farther and invite the bosses to take part in shaping said policy—or it should be.

Pronouncement of policy in this fashion facilitates company get-togethers at which all segments of management can exchange thoughts and ideas. A dinner at which a new policy is announced can go a long way toward building morale and a firm foundation for mutual effort, since the bosses can see that they are getting the dope straight from the horse's mouth. These gatherings should be informal, yet not familiar. And they should always have a specific purpose. Furthermore, the bosses themselves should not expect to appear in a passive role. Rather, they should be prepared to contribute everything possible to insure the wisest possible courses of action.

Fortunately, there are some yardsticks by which top management can measure how well a boss is fitting into the team. A national sample of opinion has shown that bosses function more efficiently and are better satisfied as:

1. They gain in authority and responsibility and the number of men in their charge increases.

2. They have greater access to educational facilities and their knowledge increases.

3. They receive more training and instruction from the company.

At one western Pennsylvania coal company, where the training of bosses is almost a rite, the importance of the relation between these men and the remainder of management was brought out graphically in an anonymous questionnaire given out after the period of instruction ended. The questionnaire simply listed the subjects covered and asked two questions: which course should be repeated and which course had been converted into the best results on the job. In each case, leadership came first, which was not too surprising. The second choice in each instance, however, was "company policy," finishing ahead even of "know-how" on production methods.

To go back to the original premise, men plus equipment **plus** management, or intelligent direction, mean production. The more efficient all of them are, including management, the better the bargain coal can offer its customers, actual and potential, and the better men, management and investors will fare. Management is an essential member of the triumvirate and its role and importance are recognized in custom, law and agreement.

Works Both Ways

Teamwork is a necessity if management is to function at its best as a part of the still larger team of men, equipment and management. The boss, whatever title he actually may bear, is a part of management, and for his own benefit, as well as for the larger benefit of all, must think and act as a part of management. In turn, his superiors in management must consider him a part of the team, accord him the status and privileges of his position, help him to better discharge his responsibilities and support him in that task.

As coal mining progresses, the work of the boss becomes more and more important and his opportunities expand in like measure. Through the sympathetic assistance of his superiors, in addition to his own efforts, he can make a real contribution to mining progress and his own advancement.

SINGLE SHUTTLE CARS
Handle 300 Tons per Shift from Loaders

New Entry Speeded by Mechanical Loading at McCandlish—Production From 15-Man Pillar Crews Averages Over 300 Tons per Shift—Ventilation Improvements and Gravity Drainage System Cut Costs

By RALPH R. RICHART
Assistant Editor, Coal Age

OVER 300 tons per shift in pillar work from crawler-mounted loaders served by single shuttle cars is the accomplishment of 15-man crews at the McCandlish mine, Hutchinson Coal Co., Meadowbrook, W. Va. Opened about 1902 and taken over by the Hutchinson organization some three years later, McCandlish now is engaged in mining both the remaining pillar areas in the original operation and a new strip of coal approximately 750 ft. wide and 8,000 ft. long north of the original boundary.

Driving of a new entry to open up the additional territory was one of the major tasks of the new mechanical mining equipment. Three hand-loading sections are still in operation, but will be further reduced when additional loading equipment now in prospect is installed. These three hand sections, plus two mechanical-loading units, operated two shifts a day, account for the present 1,700-ton daily output. Further measures taken by the present management to promote efficiency and cut cost include revision of the ventilating system and the installation of a new propeller-type fan and the construction of an elaborate ditching system to prevent floods and eliminate pumps in the main working territory.

Loaded shuttle car ready for its trip to the tipple (car-loading station).

Loading machine starting work on a fresh fall in an old pillar.

Hard Bottom Helps

A drift operation, McCandlish recovers the Pittsburgh seam, which averages 85 in. and dips generally to the northwest. The coal at the east property line is 120 ft. above that at the west portal entrance to the mine. The grade of the haulage entries generally is in favor of the loads, but grades encountered in the territories range from 0 to 5 percent, both for and against the loads. Bottom under-

lying the coal is hard and does not tend to disintegrate even where water is present—a frequent condition. Such a bottom is favorable for the operation of the shuttle cars and other trackless equipment.

About 12 in. of the top coal is left in all places. The usual "rooster" coal is absent in some sections and present in others. Where present, it runs up to a thickness of 12 in. With the drawslate between the main seam and the rider, plus that over the rider, falls bring down as much as 3 ft. of material. In completing old sections, therefore, cleaning up the old openings becomes a sizable operation. Where possible, this top material is gobbed by the shuttle cars. Usually, however, it is run through the loading station into mine cars for disposal on the surface. The next member over the drawslate and rooster is a hard sandstone.

The first mechanical mining unit at McCandlish, consisting of one Joy 14BU loading machine with a Joy 42E cable-reel shuttle car, was installed in February, 1942. Working in No. 4 Section in both solid coal and some old pillars, this unit produced 179,000 tons during the first year of operation.

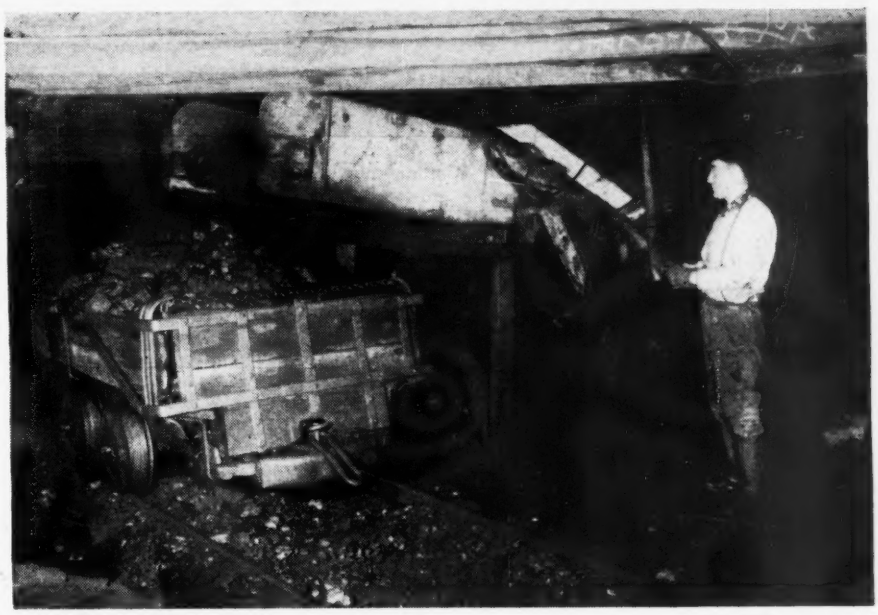
Loader Speeds Development

The second loading unit went into operation in February, 1943. It was immediately assigned to driving the entries to develop the new territory and provide a new route of access to certain old workings at the back of the property. To reach the new entries it was decided to reopen C-Face entry in No. 1 Section. This involved some 2,000 lin.ft. of opening. The top had fallen to the sandstone, and rock and slate removed averaged three 2-ton cars per foot of advance. A series of temporary dams were built to control water flow during this work. Since the top had fallen to the solid, little timbering was necessary.

The new entry, connecting with the C-Face opening and to which the second loading unit was assigned, comprised six headings 12 to 14 ft. wide on 68-ft. centers. It was driven clear through the new strip of coal and was placed against the new boundary. In all, the unit drove a distance of 6,000 ft. in twelve months—two regular production shifts and one clean-up shift a day.

With a 14-man crew on two regular shifts (twelve shifts total), this unit in one week loaded 2,645 cars to net 375 tons per machine-shift, or 27 tons per man-day. On the third shift, a five-man crew charged with straightening up, but also loading some coal to pay for its time, loaded 392 cars in six shifts to net 111 tons per machine-shift, or 19 tons per man-day. During this same week the original unit, working in rooms and pillars with a 14- to 15-man crew, loaded 2,135 cars to net 303 tons per machine-shift, or 21 tons per man-day. For the 12-months' period starting with February, 1943, both units loaded 378,500 tons.

New ventilating fan is housed in a concrete structure on the surface.



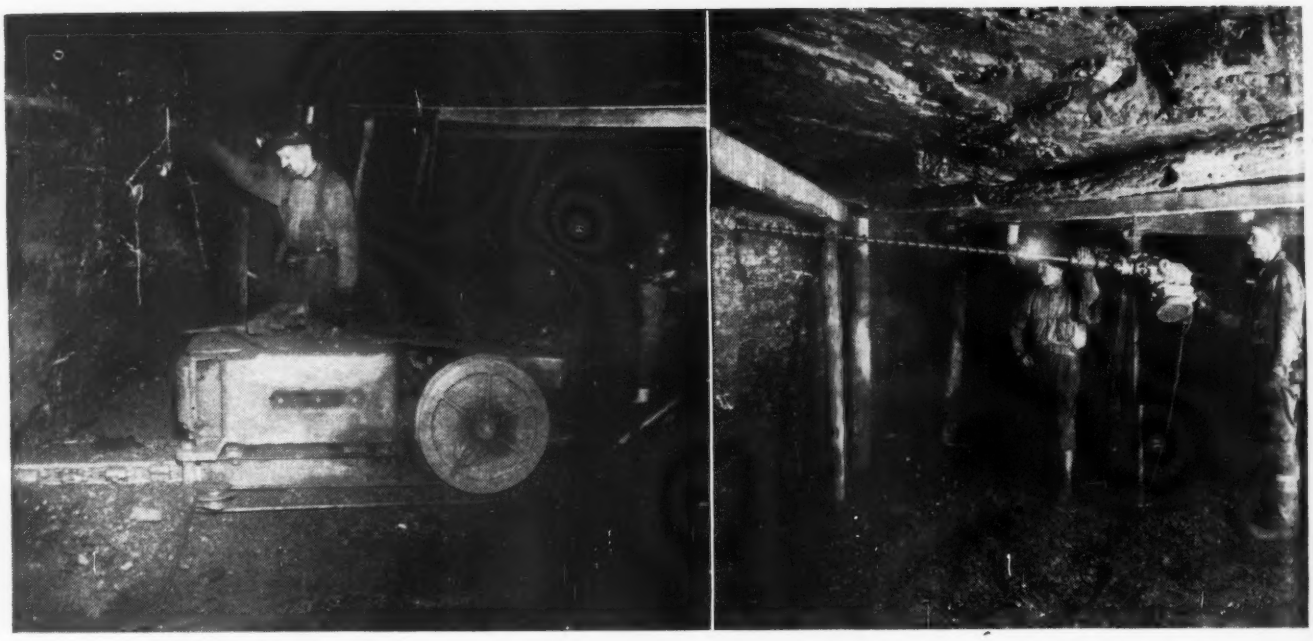
Snapper operates the tipple and signals the motorman when to move the trip for car-to-car loading. Finger-tip control facilitates operation.

Fig. 1 shows how the new territory, which lies to the left, was developed. The main haulage track was carried up the second heading from the right. A tail track, on which the tipple or loading point was stationed, was swung out to the left across the other four headings. As the development went forward, this tail track was moved ahead at intervals of four to six blocks.

In shooting the coal on this development work, Cardox was used in the bottom holes and permissible powder in the top holes. This method of shooting provided lump coal and favored loadability.

At the present time both mechanical loaders, working in pillars, are each loading over 300 tons per shift. The pocket-and-fender pillar extraction method is normally used, with pockets driven 12 to 14 ft. wide. To start a pocket a cut is made 3 or 4 ft. in from the corner and gripped out in the direction of the gob. On the next cut a thin fender of 1 to 2 ft. is left. The third cut is gripped out to the gob and so is every second cut thereafter until the pocket is completed. The fender and triangular stump is shot to cave the roof and complete the job. Pockets normally are driven up both sides of the pillar next to the gob but that is not always the case. The details of pillar mining are strictly in the hands of the assistant foreman, who makes his on-the-spot decisions to take advantage of the natural conditions as they are encountered.

The equipment assigned to one mechanized section is as follows: one



Left—Cutting machine making first cut in pillar. In the rear is the crawler-mounted truck. Right—Drilling top right hole.

Joy 14BU loading machine, one Joy 42E cable-reel shuttle car; one Goodman 12AA cutting machine equipped with either a 7½- or 8-ft. bar; one Joy T1-3E cutting-machine truck; one Chicago Pneumatic No. 474 post-mounted electric drill, equipped with Hardsocg augers and bits; one Chicago Pneumatic No. 571 hand-held electric drill for drilling stumps and fenders; one Joy PL11-7RD elevator; and either an 8-ton Jeffrey MH-100 or a 6-ton Westinghouse 904C locomotive for handling cars at loading station.

The 15-man crews in pillar work are made up as follows: loading-machine man and helper; cutter and helper; driller and helper; shotfirer; four timbermen (only two used when driving entries); shuttle-car driver; snapper or elevator man; motorman; and mechanic.

All places are timbered before the coal is undercut or drilled, using crossbars. Five holes are drilled to a place. Usually the three top holes are drilled straight in about 6 in. below the regular parting between main seam and top coal. Each outside hole is in 6 in. from the rib, with the third hole centered between the other two. On a level 5 ft. from the bottom of the coal and splitting the intervals between the holes of the top row are drilled two more holes. The right hole is drilled straight ahead and pointing down, while the left hole is drilled pointing down and to the right.

Mine officials and visitors—left to right: H. R. Hatfield, assistant foreman; John T. Phillips, mine foreman; Arnet Vance, mechanic; James R. Sutphen and R. R. Richart, Coal Age; and J. H. Musgrave, assistant superintendent.

The coal is broken down by 2x8-in. duPont "Duobel E" permissible, usually nine sticks to the place. The large-sized stick is used to concentrate the explosive charge at the back of the coal and thus get a better breaking-down and rolling-out action.

Extruded-type clay dummies, purchased as needed from an outside source, are used exclusively for stemming. A fall of coal usually nets from 18 to 28 tons, depending upon conditions.

One Car per Loader

The entire production of a loading machine is handled by a single cable-reel shuttle car. Cable-reel equipment was selected over battery-powered units because of the extremely adverse grades sometimes encountered in the territories. Each shuttle car has sufficient cable to travel 550 ft. out from the car-loading elevator, or tipple. Cars are moved for loading by the locomotives previously mentioned. Light signals, operated by a special switch added to the elevator control box, are used to impart moving directions to the motorman.

The track layout in the vicinity of each tipple is shown in Fig. 1, along with the method of moving the tail tracks.

A drainage project which allows the mine water to flow out by gravity, and in so doing eliminated a total of 61 hp. of pumping load, is now in full operation at McCandlish. Fig. 2 shows the 13,000-ft. course traveled by the water from the back workings to the pit mouth.

Water runs in open ditches from

Loading holes with 2x8-in. permissible. In the foreground is a box of extruded clay dummies used for stemming purposes.

the old workings at the back of the property down to a point where a new crossheading carries it across a 425-ft. barrier pillar to the new entry, along which it continues to the pit mouth. The usual flow is about 24 in. deep in a ditch 18 in. wide. Prior to the installation of this ditch system, six to seven pumps, including one 8-in. centrifugal pump discharging through a drillhole, could not prevent the mine from frequently being drowned out twice a year during the rainy season. In addition to eliminating a pumping load of 61 hp. the company also realized a substantial saving in cost of attendants, who in a few instances were required for round-the-clock duty.

The track in the new haulage entry is laid with 52-lb. relaying rail on 5x7-in. untreated ties. Rails are bonded and crossbonded with 6/0 bonds. Overhead is strung figure 9 deep-section grooved trolley wire, which is paralleled with a 500,000-cir.mil positive feeder. This gives the positive side of the d.c. distribution circuit a total of 900,000 cir.mils, with the result that both sides of the circuit, from the standpoint of capacity, are fairly well balanced.

Two 13-ton Westinghouse Type 158 and one 10-ton General Electric Type 711-F locomotives haul all the coal from the inside partings to the preparation plant. Since the grades favor the loads, these locomotives sometimes pull 50 and 60 cars per trip. The wooden mine cars have a capacity of two tons, mechanically loaded.

Both of the 13-ton locomotives were overhauled in the new repair shop

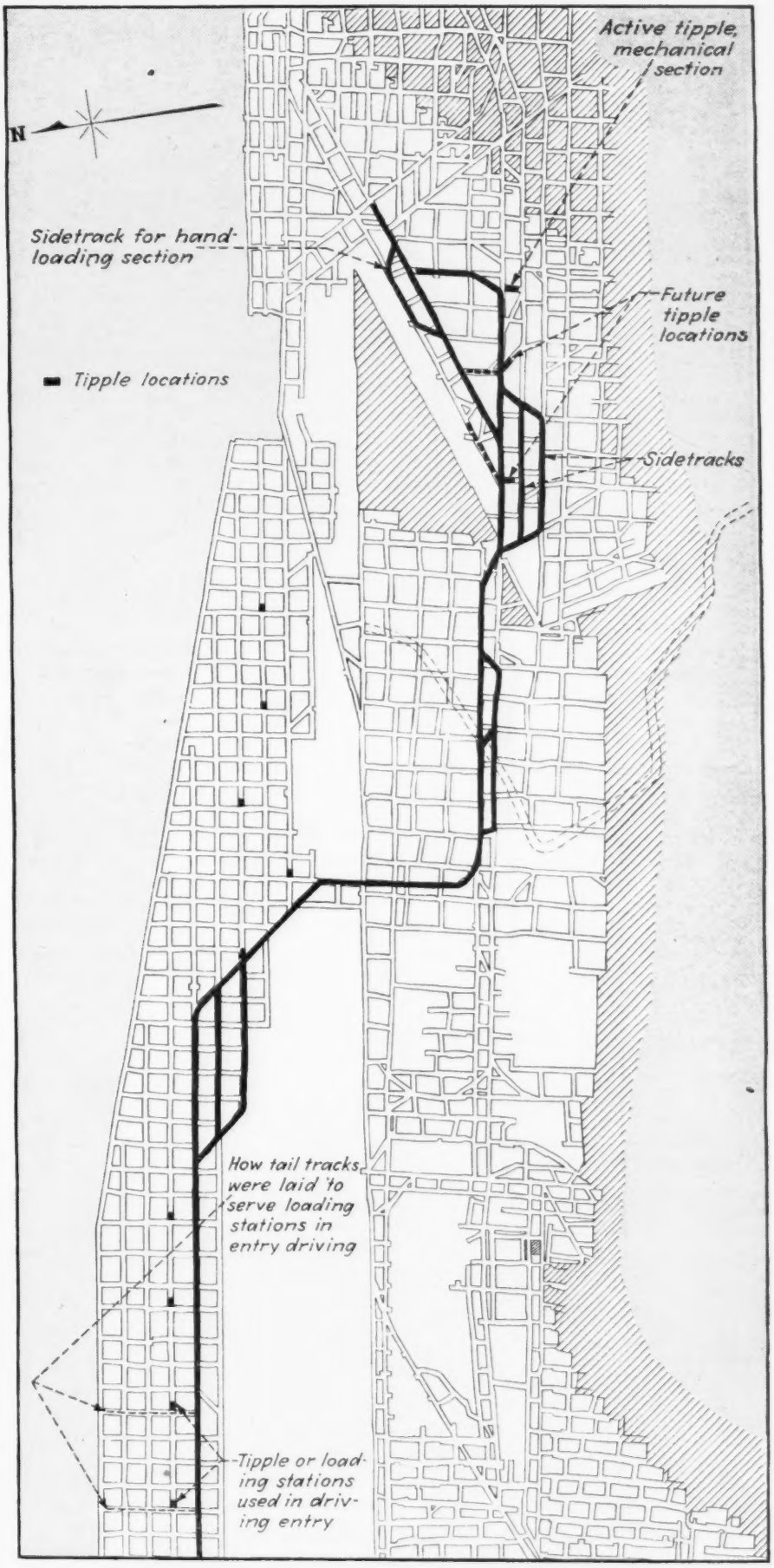

Active tipple, mechanical section
N
Sidetrack for hand-loading section
Future tipple locations
Tipple locations
Sidetracks
How tail tracks were laid to serve loading stations in entry driving
Tipple or loading stations used in driving entry

Fig. 1—General plan of development and mining at McCandlish, showing new entry (at the left) and main haulage route. Tipples or loading stations for shuttle cars are served by tail tracks located and arranged for operation as shown.

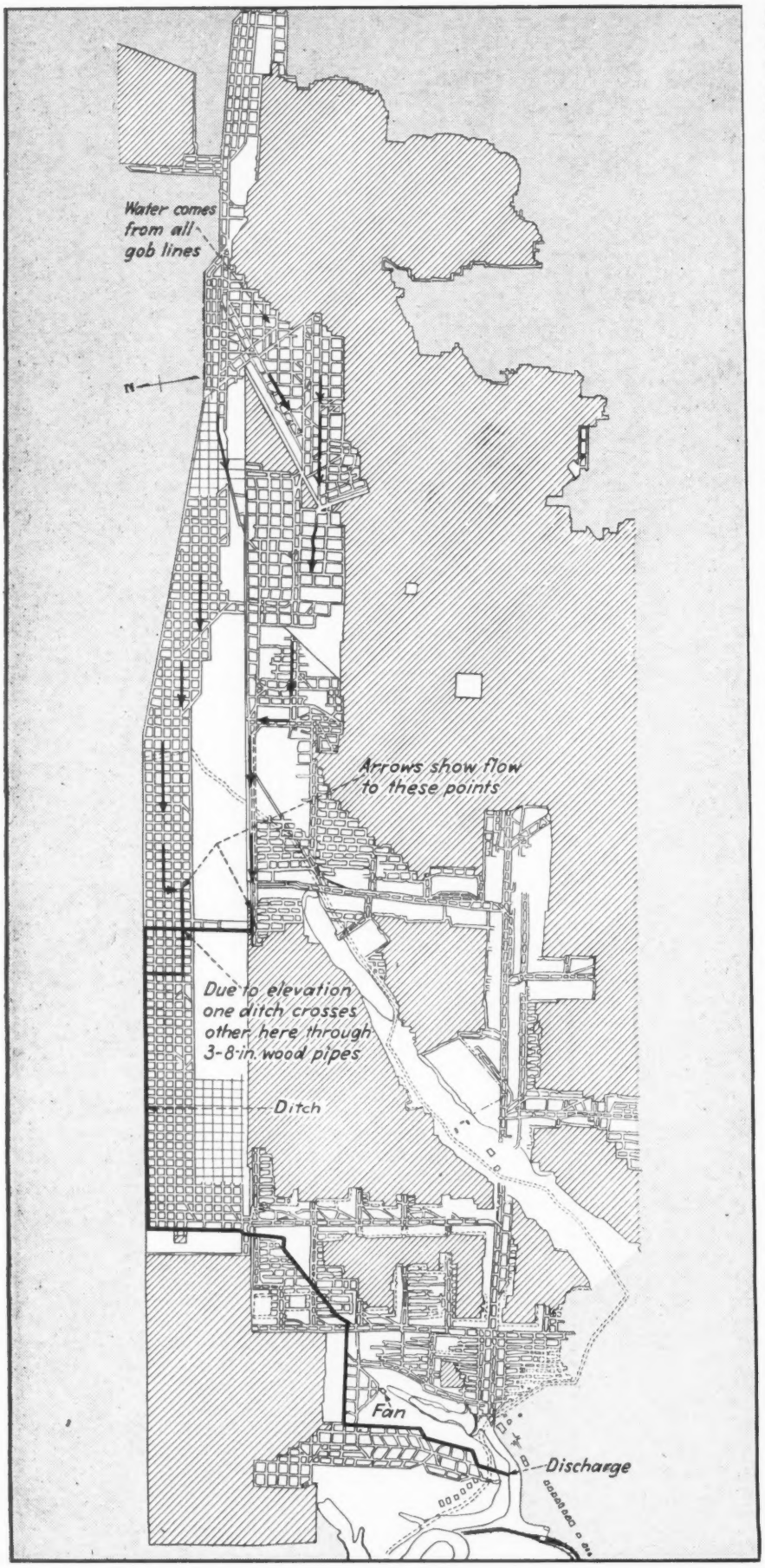

Water comes from all gob lines
Arrows show flow to these points
Due to elevation one ditch crosses other here through 3-8-in. wood pipes
Ditch
Fan
Discharge

Fig. 2—A 13,000-ft. route is traveled by the water in flowing, by gravity, from the back of the property to the pit mouth on the surface near the shop and tipple.

located on the surface, at which time old armature bearings were replaced with ball bearings to conform with some of the other locomotives of a more recent design. All locomotives are equipped with General Electric resistors, while the cutting machines are equipped with Guyan resistors.

Reduction in pumping load and increased ventilation efficiency have been big factors in reducing power costs to 3.75 to 4.5c. per ton of coal mined. Electric power for McCandlish is purchased from the Monongahela West Penn Public Service Co. Three-phase 60-cycle power at 23 kv. is delivered to the mine substation, where it is transformed to 2,300 volts by a bank of three 150-kva. transformers. Power service is metered on the 2,300-volt side of the transformer bank.

The 275-volt d.c. distribution network is energized in sections fed by separate d.c. machines. A 150-kw. Westinghouse synchronous converter, adjacent to the lamp house near the drift mouth, feeds the trolley system to the tipple on the outside. A 150-kw. Westinghouse motor-generator set and a 150-kw. General Electric motor-generator set, both deep in the mine property but still on the surface, feed independent sections of the underground system.

New Fan Installed

Use of 6-in. concrete blocks and installation of a new 6-ft.-diameter propeller-type fan has given McCandlish a modern and effective ventilating circuit. Its operating economy has already manifested itself in decreased power consumption. The 5-bladed Guyan fan replaced an old disk-type fan in July, 1943. At the present time the fan is exhausting 70,000 c.f.m. at an 0.3-in. w.g. The blades are adjustable and the fan's ultimate rating it 150,000 c.f.m. at a 3-in. w.g.

The fan is driven through V-belts by a General Electric 40 hp. 3-phase 2,200-volt induction motor operating from an overhead line. A Westinghouse manually operated reduced voltage starter together with fused primary cutouts constitute the control equipment. Both the fan and its drive are housed in a neatly constructed concrete-block structure. Explosion relief is provided by a section of low-strength concrete, which would offer a minimum of resistance, in the top of the fan house, which is at the head of a short concrete slope. A 3x5-ft. Robinson centrifugal fan supplies air to an older section of the operation in an area away from the workings from which most of the production now comes.

MECHANICAL MAINTENANCE
Facilitated by Central Shop at Old Ben

Shop Enlargement and Increased Facilities Necessitated by Purchase of 36 Loading Machines—Cranes and Trucks Save Time—New Steels Resist Wear and Rust — Good Conditions Promote Good Work

GOOD MAINTENANCE means better results in mechanical mining and this principle has guided the Old Ben Coal Corp., operating in southern Illinois, in enlarging, equipping and staffing its central machine shop at No. 15 mine, West Frankfort. Besides the general run of repair work, many changes are made in design and materials. And because of war restrictions, many supply items are reclaimed or manufactured.

While each Old Ben mine has its own mine-car repair shop, does the usual blacksmithing and many jobs of gas and electric welding, all important mechanical repairs and alterations are made in this central shop. The shop was built as a central shop when Mine 15 was developed, being 40x122 ft., inside dimensions. The maintenance work added by 36 Goodman loading machines, distributed among four operating mines, called for a program of shop enlargement and increased facilities.

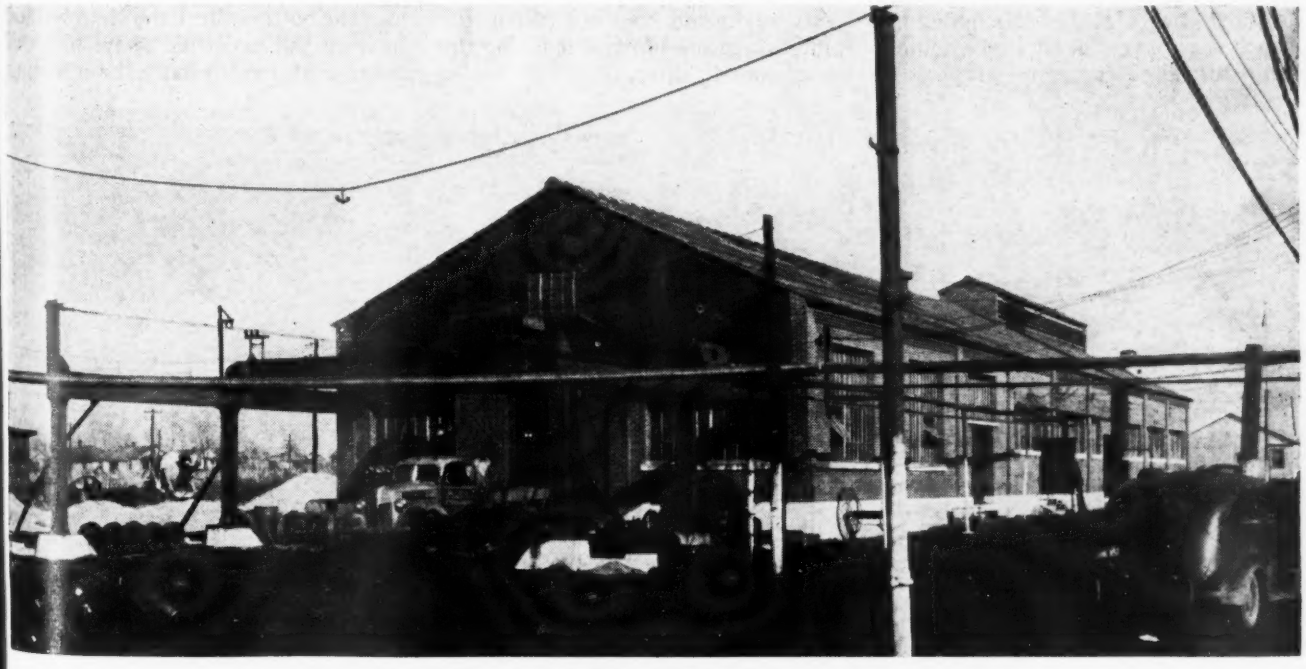
The first move was to extend the fireproof brick building 60 ft. to provide room for more machine tools. This extension is Shop No. 1 in a series of four shops in a single building. Of the two smaller shops in the center of the building, Shop No. 2 is devoted to gas and electric welding, while Shop No. 3 houses a large lathe, the hydraulic press and some smaller machine tools. At the extreme end, Shop No. 4 is for forge work, pipe and bolt machines, power hacksaw and air compressor, with a large area for loading-machine repair and rebuilding. Already the demand for arc-welding space has made necessary its overflow into Shops 3 and 4.

Was Built for the Future

This 60-ft. extension is a wartime structure with an all-time significance: all-time because mechanical mining demands maintenance facilities and workmanship not dreamed of in pick-and-shovel days; wartime because the materials with which it was built were very largely reclaimed from dismantled buildings on other properties. These included much of the brick, the steel window sash, roof trusses and purlins and the tile roof. Even the electric traveling crane and the railway-type air compressor are from hoist houses no longer needed.

In all industry, transportation is estimated to be about 20 percent of the total activity. Within a shop, perhaps, it does not take that much energy and time. But if it were not for the mechanical helps it might take more. It is quite easy to roll a pair of locomotive trucks over a concrete floor, but dragging a shortwall machine through the shop or turning a locomotive on its side under a radial drill would be a problem in manpower and pay to be reckoned with.

Old Ben has pretty well solved the problem of shop transportation with a mine track from the material hoist to and through the entire length of



View of shop. Ten-ton crane unloading a truck.

Chucking a ring (left). Cullman drive above, contactor control for motor in the rear Pushbutton is in front where the operator stands. Right—Straightening bench.

the shop, and with many cranes in the various sections of the shop. This mine track permits delivery of mine-car loads of parts and, in some instances, complete machines from underground to shop tools. Shop No. 1 has a 10-ton Whiting electric crane which spans the shop and travels by power from the inner end to 36 ft. outside the shop. Upswinging doors in the gable permit movement to the outside. This also is the receiving end of the shop for materials and machines arriving or moved out by truck. All other shops have monorail hand-operated chain blocks that reach from the track to tools where the work is to be done.

The forge corner of Shop No. 4 is featured by a special straightening bench. It is a very heavy iron machine base turned bottom up. It has a planed flat surface and is about 4½x6 ft. in size. The center happens to be hollow, but since the solid part is 18 or 20 in. wide it is a good bench. A heavy machinist's vise is bolted to one end for heavy work.

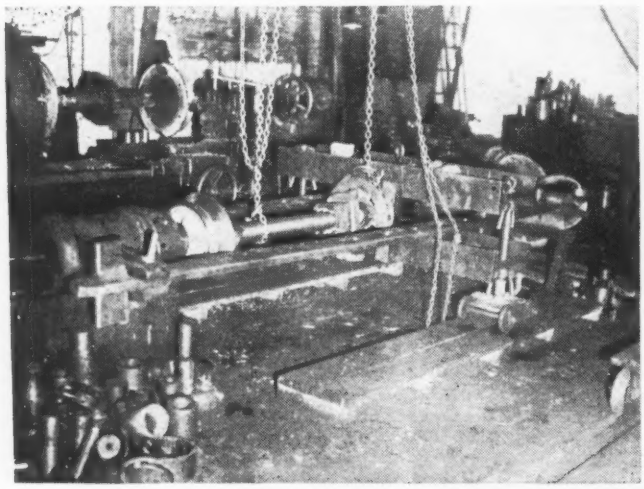
Section for Loaders

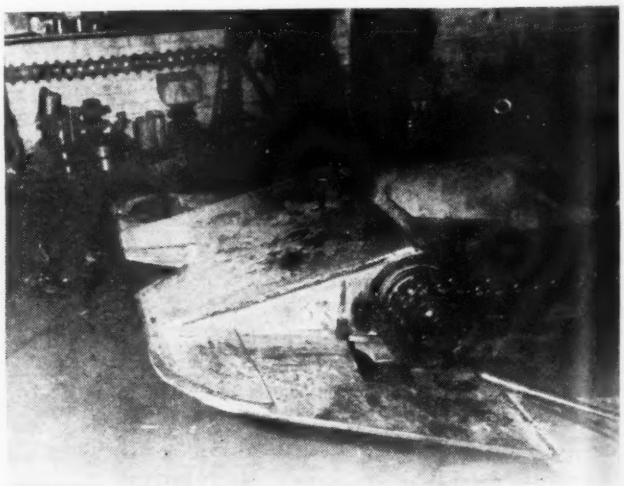
The shop section where loading machines are repaired has few tools other than cutting and welding equipment and hand tools. Much of the work is replacing worn and rusted sheets and bracing weak points. The remainder is replacing worn mechanical parts with new or reclaimed parts from other shops. Conveyor bottoms and gathering aprons worn thin or rusted out are replaced with Inland "Hi-steel." This wears bright and does not rust in the mine, increasing life and reducing the horsepower to drive.

The mechanical parts for these loading machines are reclaimed in the welding and machine shops and reassembled in the loader shop. Some of the individual jobs are explained below.

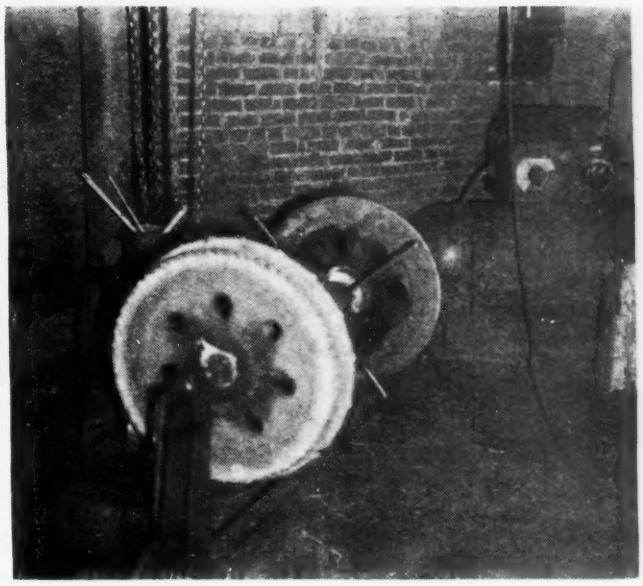
These Goodman loading machines are all track-mounted. They were found to be too close to the track. To improve the clearance the wheel treads were built up 1 in. by arc welding and finished in a lathe to the new standard diameter and profile.

One of the weak points was the nose of the loading head. The upper and lower sheets of the apron would split apart. Instead of riveting or welding across the edges of the two sheets, the top sheet is now folded over the bottom sheet and then welded to it on the underside away from the point that has to take the grinding





Pressing wheel on its axle (left). I-beams carried on jack trucks take the pressure. Right—New steel plate welded in loading-machine head.



Shortwall mining machine (left). Broken boss which carries cutter-chain driving gear has been welded in place. Special care required to get it in line. Right—Corner of welding shop. Locomotive tire being built up.

effect of the loose coal. This protects the weld and makes a much heavier and stiffer nose.

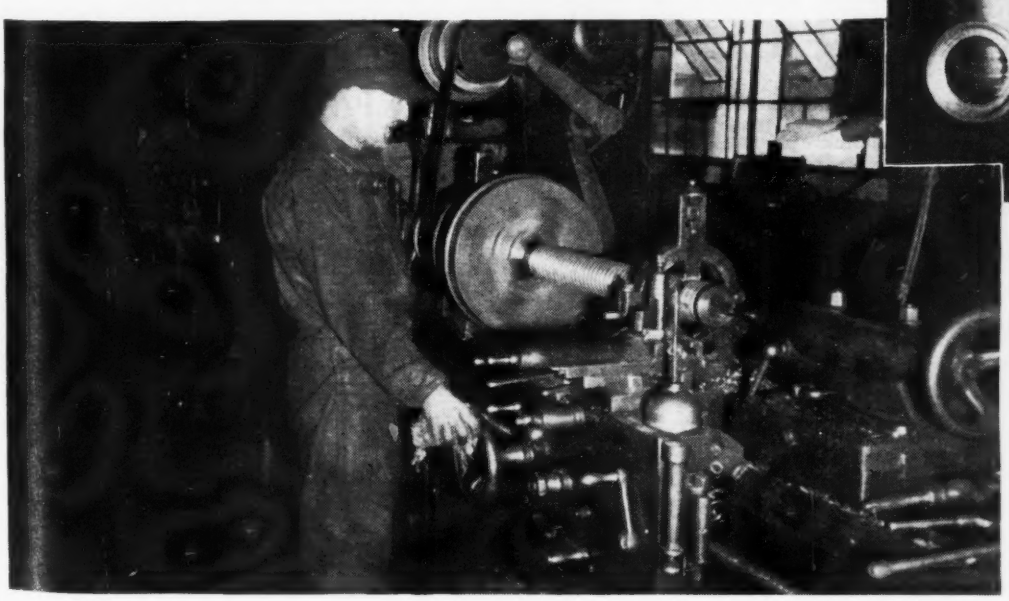
The loading head is provided with a gathering chain on each side of the conveyor equipped with digging and snubbing arms. The cutter-bit end wears off, requiring renewal. Instead of buying complete new arms, the worn end is cut off and a new stub welded on, at a saving of several dollars each.

The free end of the gathering chain runs on a roller which is mounted on a roller bearing protected by a grease seal. The plate on which this roller is mounted is slotted to provide adjustment to keep the chain tight. An interesting way of lining up this slot in a new plate, to keep the chain idler running true, has been devised. The old slot is cut out bodily with a torch by removing a section of the supporting plate about 6x10 in. in size. The renewed adjustable roller support is assembled with a prepared section of plate so that it lines up with the driving sprocket. The new plate section is then welded in in the sheet, making the entire chain assembly line up.

The rollers carrying the free ends of these gathering chains, although faced with hard metal, wear considerably and out of round. The worn rollers are chucked in a lathe and trued up with a motor-driven grinder mounted on the carriage.

The clutch-plate assembly is taken down completely, the face of the plate carrying teeth is trued in a lathe and the tooth sides smoothed up by hand filing. All extruded metal is removed and worn ruts are filed out. When reassembled the clutch works freely and there is no tendency to grab or hang.

An enormous number of cutting-machine, loading-machine and motor shafts are rescued from the scrap pile by welding. The procedure is to turn off a thin layer of surface, then build up, in many cases, the entire surface by laying beads parallel to the shaft



Making grease seals from a discarded shaft. Cullman drive on the lathe. Insert shows finished seal.

Broken locomotive frame rewelded and now being reassembled.

Extension for cleaning track being built and fitted to loader.

length. The shaft is then finished in the lathe, leaving it as true as when new. Keyways are welded over and recut. Sometimes threaded ends are left as is; sometimes turned off, built up and recut. The reason for turning off the shaft before welding is to cut out hard, rusty spots and remove the grease. A better weld is obtained.

One of the major welding activities in this shop is building up worn locomotive tires. This is all hand welding. The thread is built up by laying the beads crosswise at an angle of about 10 deg. with the axle; the flange by laying the bead circumferentially. For this work tires are not removed from the wheel centers and there is no preheating. The normal amperes of current is about 320. The usual electrode is ¼-in. Fleetweld No. 7, single polarity.

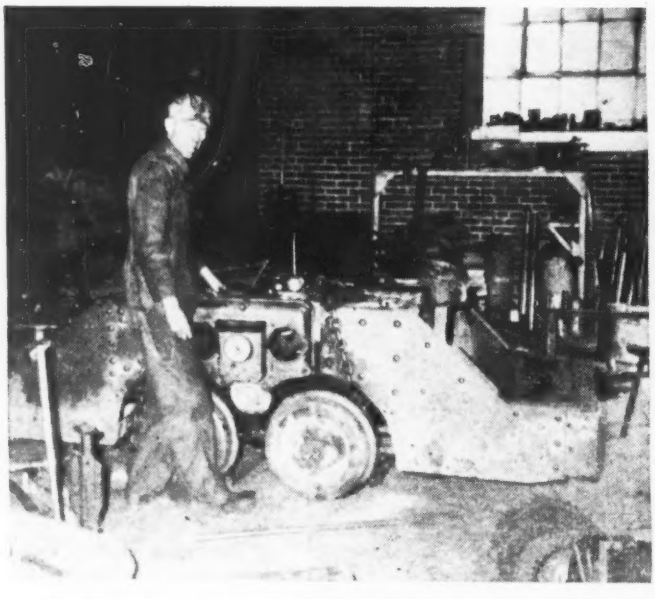
Welded tires occasionally snap in two when finished. These usually are salvaged by veeing out and rewelding. The broken ends of a 20-in. tire are separated about $\frac{1}{16}$ in. to allow for the fit when finished. In practice this seems to be just about right. Other things happen to welded tires. Welding strains and service cause cracks to appear around the tire under the flange. When these are not too pronounced, they are gouged out with a torch and refilled by arc welding. If the crack is a foot or more, the tire is scrapped, as the flange is likely to break off.

Metal Spraying Employed

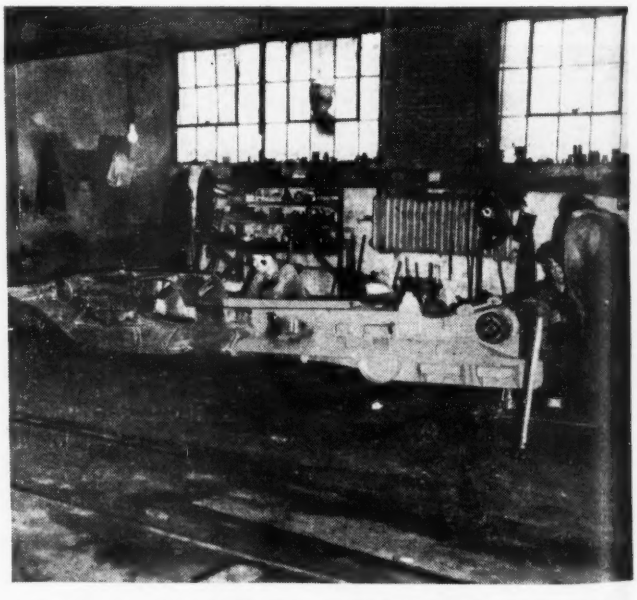
Metal spraying has been done to some extent in building up locomotive axles. The shop has no spraying equipment and so that work is done outside. This method has saved only in so far as disassembly and reassembly are eliminated. Outside charges equalled the cost of new axles. However, the new steel was saved for other war uses. This experience has not covered much time, but so far results have been satisfactory.

Heating of the shop is by American Blower Co. electric-fan-blown steam heaters providing comfortable temperature in the winter. Lighting on a sunshiny day runs 50 to 200 foot-candles, depending on the time of day and the position in the shop. This is much better than the average shop and is a potent factor in getting good work done speedily.

Those of the Old Ben management responsible for the shop extension and its revised arrangement are: Roy L. Adams, general superintendent; A. W. Spaht, general superintendent of tops; J. M MacDonald, chief engineer. In charge of shop operation is "Mack" Cremer, master mechanic. Machine maintenance for all mines is under Frank Eubanks, maintenance engineer.



Thirty-one-year-old gathering locomotive being rebuilt.



A rear conveyor for loader overhauled and being painted.

INDUSTRY PRESSES Coal-for-Victory Drive

Production Holds Its Record-Breaking Pace While the Industry Drives for Efficiency to Meet Goals Despite Growing Difficulties

With the season of increased consumption at hand, coal prepared to enter the last lap of the 1944 fuel race with at least three factors speeding it toward its 691,000,000-ton wartime goal and the Coal Age "Coal-for-Victory" awards for increased tonnage and efficiency. These factors were:

1. **A slim margin of tonnage over par at the halfway point.**

2. **Maintenance of production at relatively high levels despite increasing difficulties.**

3. **Increased determination to employ every possible means of meeting the wartime demands for coal.**

Barring unforeseen circumstances, coal therefore looks forward with reasonable confidence to breaking its all-time production record, thereby assuring the national goals of 626,000,000 tons of bituminous and 65,000,000 tons of anthracite in 1944.

Satisfactory as these prospects are, the major part of the task—and the most difficult—lies ahead. It is a task to tax the imagination, the ingenuity and the endurance of everyone in coal mining. But Coal Age shares the industry's confidence that it can be done and in that feeling of confidence offers its "Coal-for-Victory" awards to recognize meritorious achievement and encourage the adoption of every means that will lead to that achievement.

MEETING 1944 GOALS Methods being used more and more by operators to increase tonnage and efficiency are summarized on the following pages. These same methods are looked to for low cost in the future—a potent factor in progress in the days to come.

FOR PRODUCTION EXCELLENCE— "COAL-FOR-VICTORY" AWARDS

Two "Coal-for-Victory" awards are offered by Coal Age with the support and cooperation of the Solid Fuels Administration for War. One will go to mines increasing their 1944 fresh-mined tonnage 6½ percent or more over 1943. The second will go to mines boosting output per man-shift 10 percent or more in 1944 over 1943. Members of the supervisory staffs at winning mines or collieries will receive similar awards.

The "Coal-for-Victory" awards are offered as a means of recognizing the industry's wartime contribution, as an incentive for increased production and as a means of stimulating permanent improvement in methods.

Any mine or colliery with a War Production Board serial number that was open for production in 1943 and 1944 is eligible to qualify for an award or awards. Terms and conditions are reprinted on p. 4 of this announcement.

COPIES of the announcement and the terms of the awards—available from Coal Age in reasonable quantity at no cost.

APPLICATION BLANKS—in preparation for mailing in ample time to be filled out and returned by Jan. 31, 1945.

JUDGES—to be selected shortly and announced in Coal Age.

BADGES—suitable badges being designed and will be furnished at cost to mines desiring to present them to employees.

ADDITIONAL INFORMATION—will be presented in Coal Age as it becomes available.

12 KEYS TO MORE TONNAGE AND HIGHER EFFICIENCY

COAL has evidenced its determination to meet or beat 1944 production goals by increasing output and raising efficiency. Every advance in that direction means not only a step toward winning the war and, incidentally, qualifying for a Coal Age "Coal-for-Victory" award, but also the building of a sounder foundation for the future, when efficiency and cost will be more vital than ever before. To help in the attainment of these goals, Coal Age briefs in the following a number of proved suggestions for raising output and boosting efficiency. For additional information, see the April, 1944, "Modern Coal Production Number."

1. Equipment

The machine as a method of increasing efficiency and reducing cost is firmly established in coal mining. Installation, as far as available, and use to the fullest extent, of equipment such as the following will facilitate reaching present production goals and building a sound foundation for the future:

1. Loading machines, conveyors and other mechanical mining equipment.
2. Modern high-capacity cutting and drilling equipment.
3. Modern, high-capacity mine cars, shuttle cars, mother and main-line conveyors, locomotives, hoists and other transportation units.
4. Modern, efficient pumping and ventilating equipment.
5. Modern, efficient power equipment.
6. Modern, efficient preparation equipment.
7. Modern, well-equipped shop and maintenance facilities.

Additional manpower conservation and cost reduction also is provided by such equipment as cranes, derricks and special trucks for unloading and handling supplies; car hauls, trip feeders and automatic cagers; automatic controls for substations, pumps, fans and the like, etc.

2. Productive Time

The terms of the last wage agreements provide many mines with a real opportunity for increasing total output and output per man. Where steps have not already been taken, the question of reducing travel time should have serious study. Often, by proper thought, such reduction can be accomplished without a great outlay of money. But substantial investments may be warranted to secure the maximum benefits of reduced travel time now and in the future.

3. Concentration

Getting the maximum output from the smallest possible area normally means higher efficiency and lower cost through a lower investment in haulage, ventilating, drainage, power and other service facilities and the labor for their operation and maintenance; better supervision and a general tightening up of the production machine. The benefits of concentration have been proved over and over and over. Recently, the principle has been extended in the direction of closing less efficient or materially undermanned properties and transferring equipment and men to others. If other considerations do not bar such a step and it results in an increase in total output and output per man, the advantages are self-evident.

4. Power

Good voltage (rating of the motor or better) at the face not only is economical in itself but it insures operation of equipment at capacity, reduces stoppages for repairs and creates a better spirit among the men. Bad power almost always is reflected in a lackadaisical attitude on the part of the crew. The answers are ample copper and/or substations close to the working sections. The more of the latter, incidentally, the less, usually, is the need for the former. Even if it meant detaching some men for a shift or two and thus a temporary loss in output during a substation move, that loss is offset several times over in the long run by the increased efficiency of face operations.

5. Materials

Materials and parts on hand at the points they are needed insure maximum use of the productive capacity of mining equipment. The result is an increase in overall tonnage and tonnage per man, flowing out of such things and quick replacement of parts, track kept to the face at all times, elimination of falls due to lack of timber, and bad air and smoke from lack of brattice

cloth, etc. Supply systems should insure that parts and materials are on hand and also that they are delivered at the points they are needed without loss of time. Auxiliary supply and parts depots in or near working sections have been proved worth while by experience in numerous mines.

6. Maintenance

A machine that is down an average of 6 percent of the available working time manifestly cannot produce as much as a machine that is down only 1 percent. Neither, by the same token, can its crew, although their expense usually goes right along. Good maintenance, while it may cost a little more, pays off several fold in higher output and lower cost. It starts with good voltage and an adequate supply of parts at the right place. It also involves sufficient men with the requisite training; shop and repair facilities ample for the job; good lubricants, lubricating equipment and methods; a good system of reporting on equipment condition and repairs necessary, supplemented by regular inspection and overhauling; spare equipment as necessary; repair facilities in or near the working sections where possible; an adequate supply of meters and other instruments; adequate welding equipment; and the use of modern alloy steels and other high-strength long-lived materials, plus facilities for redesign when it becomes necessary.

7. Coal Supply

With a loading machine, tons available in a place and total places for loading in a shift are vital factors. In conveyor mining, places per section normally are fixed by the system employed, but if it is possible to increase that number without offsetting handicaps in other directions, it may be possible to handle the increased tonnage with the same haulage, track and other auxiliary labor, with a corresponding boost in efficiency. Tons per fall is just as important in conveyor work as in operation with loading machines, since the fewer times cutting, drilling, conveyor extension, timbering and the like must be repeated the more time there is available for loading.

The more tons per place with a loading machine, the fewer the moves it must make and consequently the more time it has for loading. It also should have a working territory providing places commensurate with its capacity. This increase in machine output may necessitate more men, but it pays to add them to the point where individual output begins to drop. Providing the proper number of places results in better utilization of the investment in the machine and also in increased output per man within the limits of work available. The same principle holds true in hand loading. For example, suffering a locomotive and crew to gather only 70 cars where a rearrangement of territory would permit it to average 100 is not making the best of either equipment or manpower.

Increasing tons per fall can be done two ways: (1) increasing the depth of the cut and (2) widening the place, provided roof conditions will permit.

8. Face Preparation

Condition of the coal after it is shot down can materially affect the performance of either machines or hand loaders. Better "loadability" therefore is an end earnestly to be desired. It is attained by good cutting, selection of the proper breaking medium and careful study of the drilling pattern. Savings of as much as 50 percent in cost of explosives and a 5 to 10 percent increase in output of prepared sizes and in tonnage per loading machine have followed revisions in face-preparation methods at a number of mines.

9. Transportation

Good transportation is a major factor in the performance of men and equipment at the face. It is compounded not only of equipment (mine cars, shuttle cars, conveyors) but also of methods. Track layouts providing a short changing distance should be the rule in all loading-machine mines and also can help in hand-loading operations, along with steps toward insuring an ample supply of cars in the working section at all times. Where conveyors are employed, trip-changing facilities should keep stoppages for this purpose to a minimum (see March, 1944, *Coal Age*, p. 78, and April "Modern Coal Production Number").

10. Coal Salvage

A fact often too little appreciated is that coal on which considerable money has been expended all too frequently is left in the mine or thrown onto the refuse bank. Some of the remedies for the former are: good clean-up in loading and prevention of loss in transit. Even if such loss were only 1 percent, it aggregates quite a few tons per day, most of which could be saved by a tightening up with little or no expense. In some cases, however, considerable investment is warranted, some operations having installed complete cleaning plants for salvaging coal from mine rock.

Loss to the refuse bank is a matter of tuning up preparation, with expenditures for auxiliary equipment as may be necessary, including pickings and bony crushers and facilities for re-treatment. Tuning up mechanical cleaners is an excellent method of preventing coal loss, although there are many others that a little study will reveal, including such seemingly minor items as proper

picking-table lighting and facilities for splitting lumps to separate attached impurities.

11. Stripping

Modern stripping is inherently highly mechanized and correspondingly economical of manpower. But, as in any other activity, higher efficiency and lower cost follow use of the most modern and highest-capacity equipment, whether it be a shovel or a truck. In addition, stripping operators have found many other practices a help, such as:

1. Modern control equipment for shovels and draglines to increase output and reduce maintenance.
2. Installation of auxiliaries, such as scrapers, small draglines, tractors and bulldozers, to relieve the stripper of miscellaneous, less-inefficient work.
3. Drainage systems which keep water away from the pit or insure its prompt, efficient removal.
4. The best possible systems for preparing overburden, since this is directly reflected in shovel performance, area uncovered and maintenance.
5. Proper preparation and shooting to speed loading.
6. Installation of the largest possible haulage equipment, either rail or truck, using modern locomotives or modern truck engines, such as diesel or butane; shortest possible hauls, minimum grades and the best possible track or truck roads.
7. Modern power equipment and facilities.
8. Good shops and other maintenance facilities, supplemented by a modern supply system insuring the presence of materials and parts when and where needed.
9. Coal loading, handling and preparation facilities which keep losses at a minimum.

Coal Age material on high-capacity efficient coal stripping includes its series on stripping fundamentals. Topics so far treated include: drainage, January, 1944, p. 59; high-wall preparation, February, p. 88; stripping methods and equipment, March, p. 84; loading, May, p. 79; rail haulage, June, p. 81; truck haulage, July, p. 80; truck roads, August, p. 96. Other data also appear in the April "Modern Coal Production Number."

12. Safety

Mine accidents injure or kill men, destroy equipment and facilities and interrupt production, often for substantial periods. High output, high efficiency and low cost therefore dictate the maximum possible application of every possible safety measure.

How Your Mine Can Win the "Coal-for-Victory" Awards

1. Any mine or colliery in the United States that has a War Production Board serial number and was open for production in the calendar years 1943 and 1944 is eligible to compete for the "War Production Efficiency Award" or the "Victory Production Award" or both.

2. The "War Production Efficiency Award" will be presented to any serialized mine or colliery otherwise qualifying that increases its fresh-mined output per manshift 10 percent or more in the calendar year 1944 as compared with the calendar year 1943. This award is intended to recognize outstanding achievement in promoting efficiency by the methods normally employed, and judging shall be not alone on the results but also on how they were achieved. Mines filing for the "War Production Efficiency Award," therefore, shall supply a statement outlining how the increase in output per manshift was obtained and shall agree to supply, upon request, such additional information as may be required to permit a decision to be reached.

3. The "Victory Coal Production Award" will be presented to any serialized mine or colliery otherwise qualifying if its fresh-mined coal production in the calendar year 1944 exceeds its fresh-mined coal production in the calendar year 1943 by 6½ percent or more.

4. More than one mine or colliery operated by any one company is eligible for and may receive either or both awards if they otherwise qualify. The winning of an award, or awards, by one mine or colliery operated by a specific company shall not prevent another mine or colliery operated by the same company from also winning one or both awards if it otherwise qualifies.

5. The awards to mines or collieries will consist of certificates attesting their contribution to the war effort by exceeding 1943 calendar-year production or output per manshift by the required percentages in 1944. Individual certificates also will be awarded each member of the winning mine's or colliery's supervisory staff attesting their contribution in helping the mine or colliery to win an award or awards. Should the operating company so decide, buttons for each employee at winning mines or collieries will be made available by COAL AGE at cost.

6. Qualifications for the awards shall be judged on the basis of statements submitted by authorized officials of the companies operating the mines or collieries in question on official forms to be supplied by COAL AGE. Statements must be completely filled out and must be filed on or before Jan. 31, 1945. Postmarks shall be the guide in judging acceptability under this restriction.

7. COAL AGE reserves the right to request from appropriate government or other statistical agencies certification of production and other figures submitted by coal companies filing for an award or awards, and such companies shall agree that statements are submitted subject to such certification.

8. A board of judges nominated by COAL AGE shall be the sole judges of the qualifications for awards and coal companies filing for the awards shall agree that their decision shall be final.

9. Realizing that changes arising out of the course of the war might materially alter conditions, COAL AGE reserves the right, if it should appear to be necessary, to modify the terms and conditions of the awards or adopt new terms and conditions, to the extent necessary to permit giving proper recognition for meritorious work in supporting the war effort.

10. Announcement of the awards will be made as soon as practicable after the final date for filing.

Interior view of pumping station shows the vertical-type motor drives and the control equipment mounted on the rear wall.

DEEPWELL PUMPS

Unwater Bast Mine From Surface Station

Turbine Pumps Lowered Into Drillholes Facilitate Reopening of Locust Run Mine—Pressure Against Old Dam Between Mine Workings Eliminated for Safety Reasons — Pumps Run During Off-Peak Periods.

HOW TO REMOVE three hundred million gallons of water from the adjoining Bast mine and thus meet safety requirements before reopening its Locust Run mine was the problem confronting the Raven Run Coal Co.'s operation at Centralia, Columbia County, Pa. The installation of two 2,500-g.p.m. deep well turbine pumps with 12-in. discharge lines, running during "off-peak" periods, was the answer.

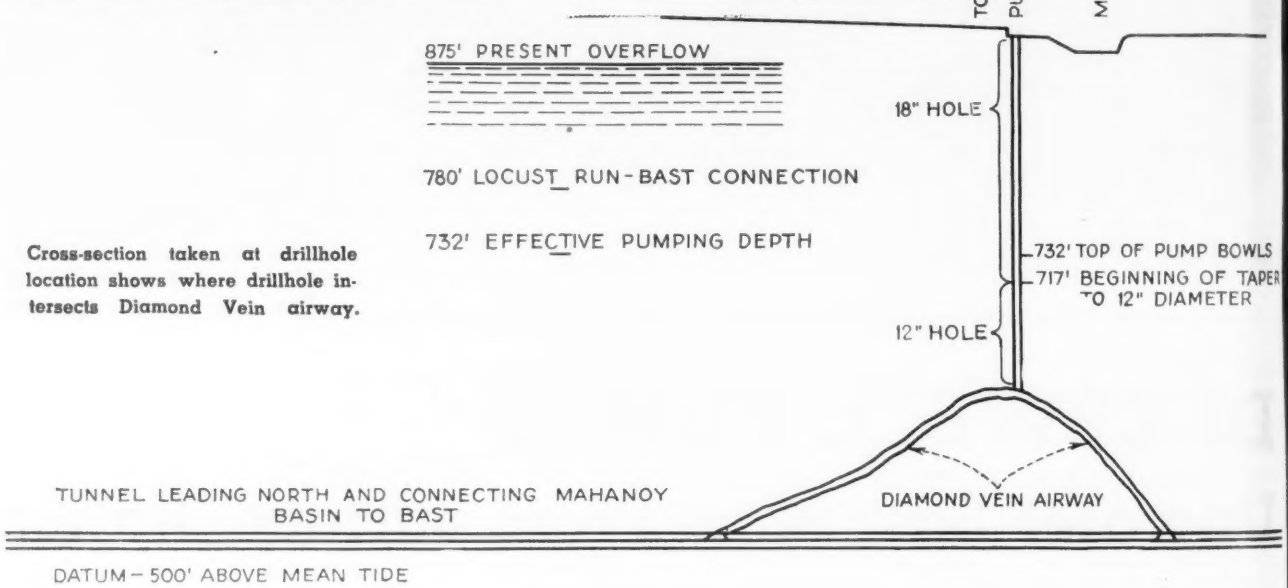
In the early days of the operation of the Locust Run mine, an entire portion of the Mammoth and Primrose veins had been worked from the Bast mine. Upon the termination of the lease of these veins a dam was constructed, in the workings common to both Locust Run and Bast, to protect Bast in the event of exhaustion or abandonment of Locust Run. No difficulty was experienced for many years, as both mines were operated steadily and the water in both mines was kept well below the level of the dam.

Abandoned Mines Fill

However, the policies of the operators of the two mines prompted their abandonment. Subsequently the water rose on the Locust Run side of the dam until it attained an elevation of 230 ft. over the dam and on the Bast side to an elevation of 95 ft. At these respective elevations the water in the mines found its way to the surface through drainage drifts.

In 1943, when the Raven Run Coal Co. undertook the task of reopening the Locust Run mine, the State Department of Mines insisted that the water level in the adjoining Bast mine be reduced to a point below the level of the dam, since the condition of the dam was not satisfactorily established. The problem then was to establish a pumping station at the Bast mine of

Exterior view of pumping station taken from the highway shows the equipment installed for station maintenance.



Cross-section taken at drillhole location shows where drillhole intersects Diamond Vein airway.

sufficient capacity that the average inflow might be handled, and at the same time of sufficient capacity that the level of the water standing in the mine could be lowered in a reasonable period of time. In addition, it was desirable to locate the pump station so that a sump or "pool" with sufficient capacity would be created to permit the pumping to be done on "off-peak" periods, still allowing for abnormal inflows of water.

A combination of circumstances crystallized the plan of attack. It was found that at a point near Mahanoy Creek a vertical line drawn from the surface could be made to intersect an airway that had been driven over an anticline in the Diamond vein. The Diamond vein was the uppermost vein that had been worked and the airway, shown in the diagram, was close to the main tunnel of the Bast mine and was included in the reserve pillar of the tunnel. It was therefore presumed that there had not been any disturbances in the vicinity due to robbing and that a hole could be drilled that would not require a lining.

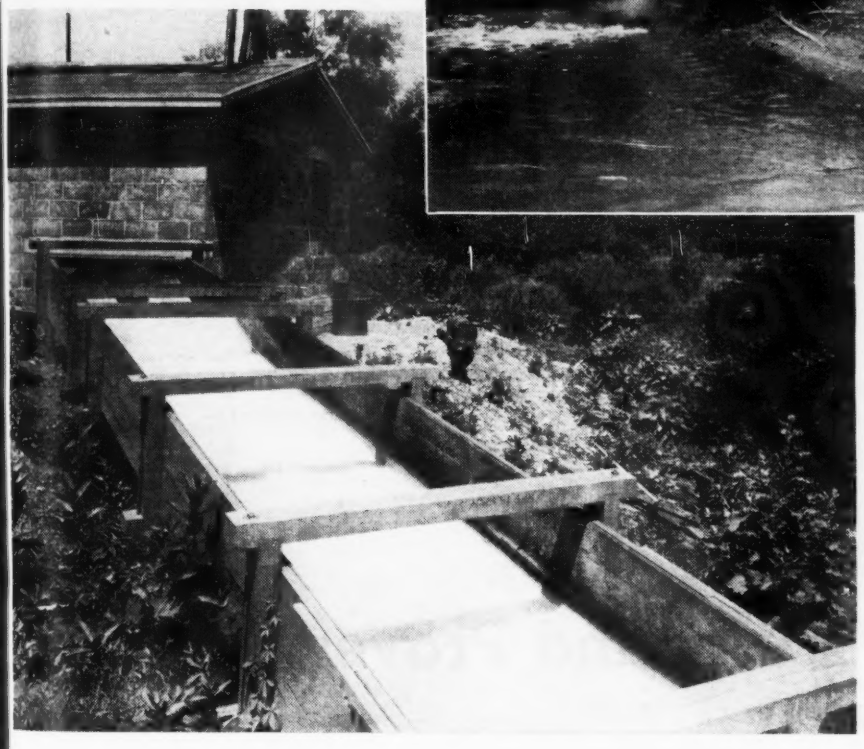
Pump Capacity, 5,000 G.P.M.

After a study of the pumping charts of the Bast colliery and a study of the quantity of the water contained in the Bast mine it was decided that the elevation of the pump should be fixed at 730 ft. This would provide a 50-ft. sump or pool below the level of the dam, the elevation of the dam being 780 ft. It also was decided that a pumping capacity of 5,000 g.p.m. be established at that point and that the pumping capacity be in two units to permit greater flexibility of operation.

A contract then was let outside for drilling the boreholes, which were to be 18 in. in diameter to a depth of 185 ft., dropping to 12-in. holes at that point. The 12-in.-diameter holes were to be continued until they broke through into the Diamond vein airway. These holes were successfully drilled with a churn-drill outfit in spite of several crevices.

The pumps selected were Pomona deepwell turbine units capable of delivering 2,500 g.p.m. against a head of 162 ft. while running at 1,760 r.p.m. and using 131 hp. at the pump shaft. Motors furnished were Westinghouse line-start, 125-hp., 1,760-r.p.m., Type CS, vertical, hollow-shaft, squirrel-cage induction units for operation on 440-volt 3-phase 60-cycle current. The turbine assemblies were 2-stage, 16-in., medium-capacity type, of zincless bronze construction with a stainless-steel impeller and shaft operating in cutless rubber bearings. Due to the

Water from pumping station empties into Mahanoy Creek. Transformer substation is in the background.



Two 12-in. discharge lines pour water into box-shaped flume.

location of the pump element, no solids were anticipated in the suction; however, the pump elements were equipped with 12-in. bronze cornucopia-type strainers.

Each discharge elbow was coated inside at the shop with Bitumastic coating and each 12-in. steel-column pipe also was coated inside and outside at the shop. The driving shaft, which is water-lubricated and operates in rubber bearings, was sleeved with stainless steel at the bearing points. In addition to the stainless-steel sleeves, the entire shaft was chrome-plated for further resistance to the slightly acid mine water.

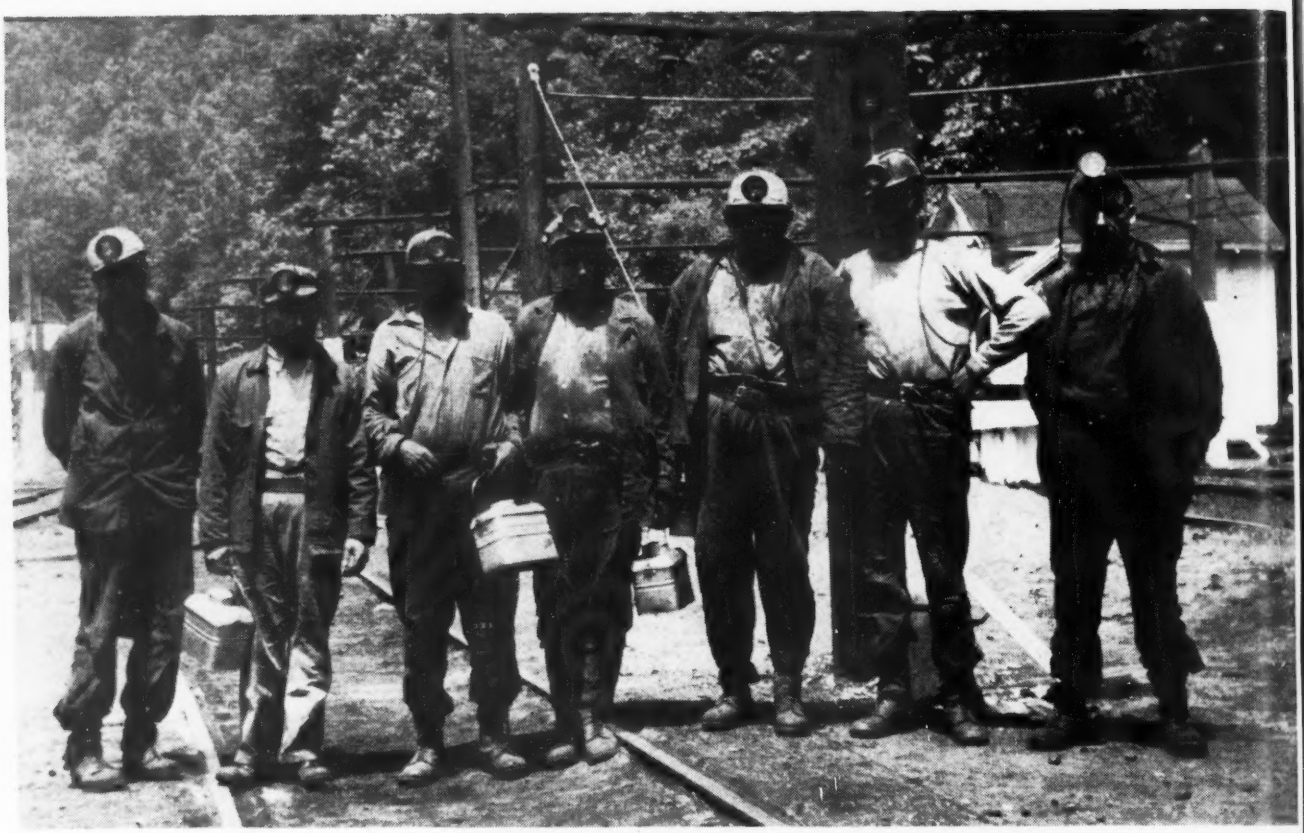
Power to operate the pumps is carried at 2,200 volts on a pole line 1.3 miles long to the pump headhouse where it is transformed to 440 volts. Three General Electric 100-kva. Type H single-phase transformers, connected delta-delta, form the outdoor substation transformer bank. The station is protected by Westinghouse primary cutouts and pellet arresters.

Units Fully Protected

Pump motors are protected by Westinghouse fused safety switches and General Electric Type CR-7006 magnetic starters with overload protection. Single-phase and phase-reversal protection also is incorporated in the control equipment. A Hazleton float switch connected to the discharge elbow acts to stop the motor and prevent damage to the drive shaft and its bearings in the event the sump is pumped dry or for any reason the water column of the float switch is not kept well filled.

The assembly and installation of the pumps, motors and starting equipment was done by the Raven Run Coal Co. under the supervision of the Mine & Mill Supply Co., Scranton, which furnished the pumps.

The pumps are housed in a roomy concrete-block house designed especially to facilitate the maintenance of the pumping equipment. The steel structure for carrying the chain block by which the pumps are handled seemingly is rather elaborate. The left end of the topmost I-beam is pivoted at the tripod support and the right is free to swing to the right and left by means of a roller support. It works out quite satisfactorily, as perfect registry is obtained over each hole and the pump column is never subjected to side strains while being lowered. The roof of the building is removable, as well as the lintel of the double doors, so that parts may be "trolleyed" directly out of the building for storage when disassembling the pumps.



Safety clean-up crew at the end of a shift's work. C. E. Costner (third from the right) has been foreman of the crew for three years and wears a hat denoting no accidents.

SAFETY CREW
Eliminates Hazards and Proves Sincerity

Allowance of 1c. per Ton Made to Eliminate Physical Hazards—Work Done by a Ten-Man Crew With Foreman Under Supervision of Safety Director—Benefits Include Proof of Company's Sincerity

By ROBERT DICKSON
Safety Director, West Virginia Coal & Coke Corp., Omar, W. Va.

IT HAS BEEN truthfully said that where a coal company shows its sincerity in an accident-prevention program the workers themselves will respond more readily to the rules and regulations governing their own safe conduct.

It is difficult for any mine management to instill the safety spirit in men when that management continues to tolerate unsafe conditions that in themselves are potential for accidents. With this thought in mind our company at my request began over five years ago to allow 1c. per ton of total production for use in eliminating such conditions. A ten-man crew with a foreman in charge was, and still is, employed on this work. This allowance doesn't seem much, but when the monthly production is in the neighborhood of 300,000 tons one can readily appreciate that much can be done with the resultant $3,000. In this period of time our eight mines have been greatly benefited by this arrangement and remarkable progress has been made in removing sub-standard conditions.

The work of the crew includes making clearances, cleaning up obstructed airways, taking down overburdens on haulage roads and checking and resetting old and broken timbers. They make manholes, whitewash them, number them and install reflector buttons on either side, which, in every sense of the word, properly designates them. This foreman and crew of men are under the direct supervision of the safety director, who instructs them in the work to be done. In these unusual times, when manpower is scarce, the management of any one of our mines finds it difficult to maintain men at all times to do this dead work, although they try their best to aug-

ment this crew whenever possible. If this crew was under the supervision of the mine superintendent, we would very often find its members replacing workers, such as trackmen, slatemen, shotfirers, etc. With the present arrangement, however, where the crew works under the safety director it assures uninterrupted progress of the work it was organized to do.

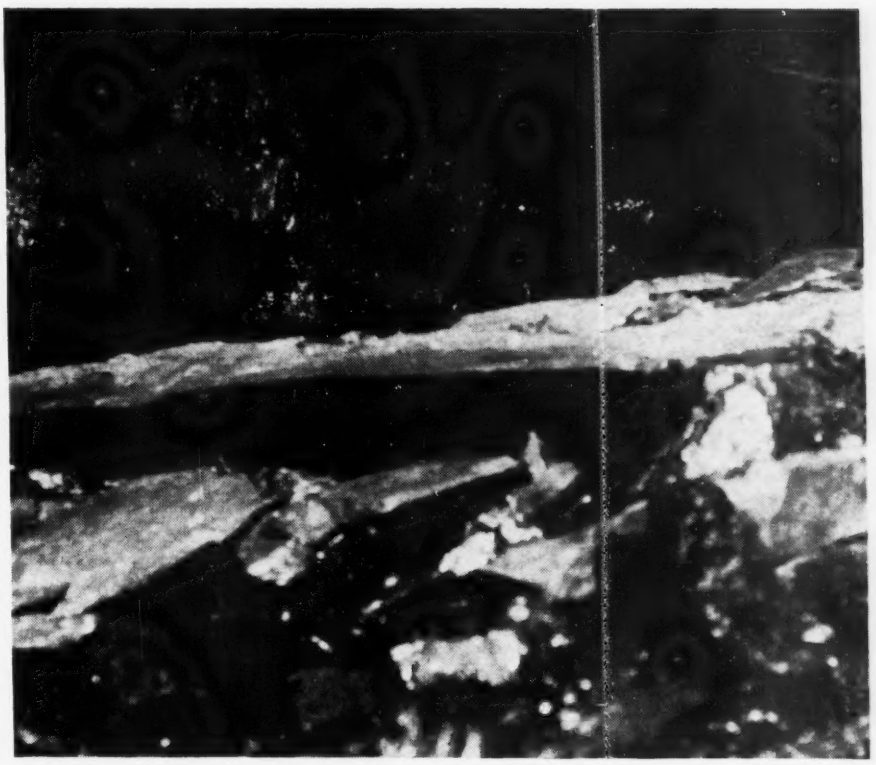
Men Approve

This method of promoting safety has won the praise of the men at the face, who see for themselves the sincerity of the company in accident-prevention work. To further prove our sincere interest in safety we do not hesitate to send this crew to take care of bad conditions that have been reported by the men themselves.

This plan has been questioned by some mine officials who believe that the mine superintendents might have a tendency to let certain things go until this crew can get to them. This, however, is not so because, after all, there still are some good traders in our business, and if a superintendent wants the crew to do something for him I usually can strike a bargain that he will do something else for me.

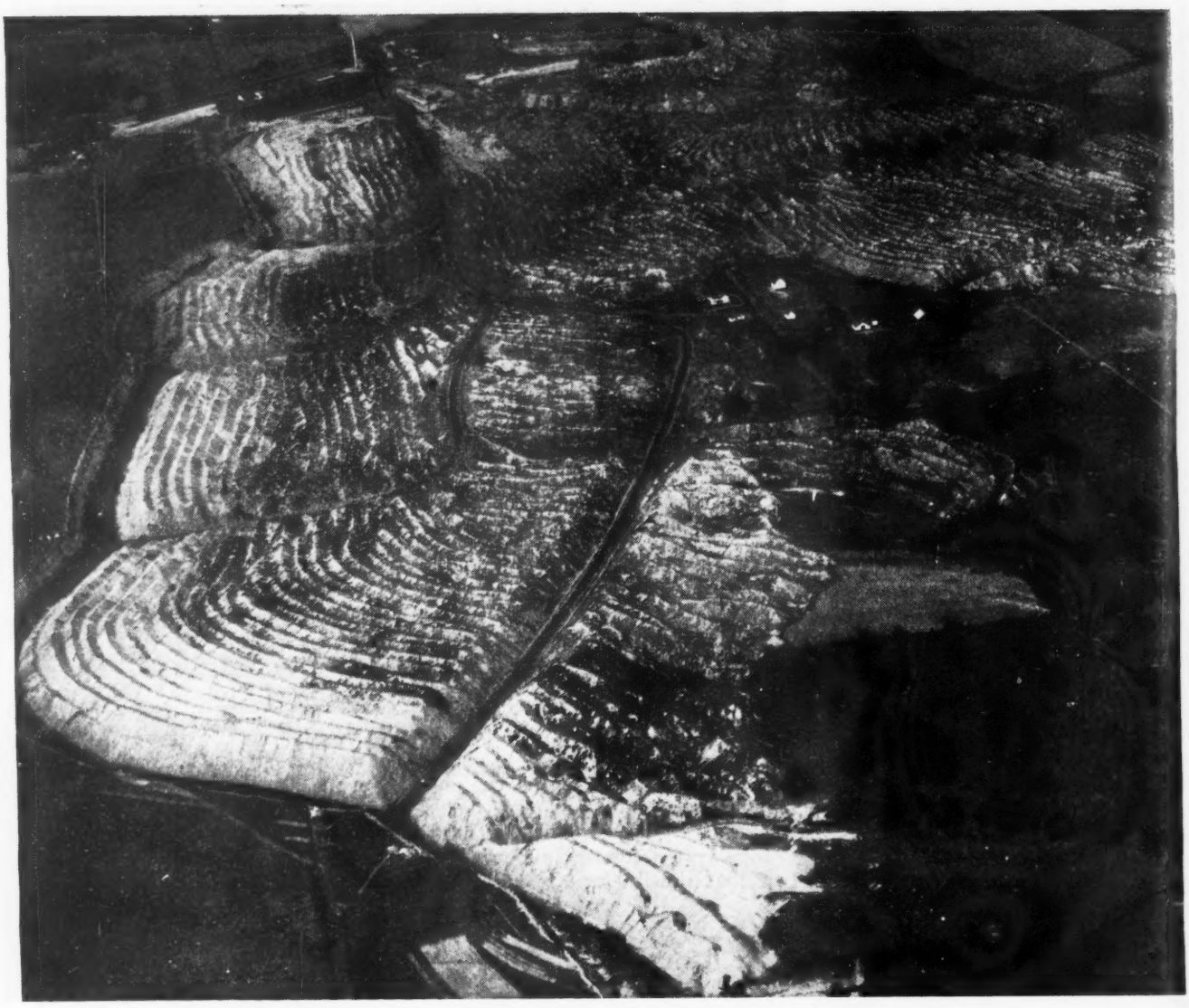
There are lots of ways that coal companies may take in promoting safety. However, we must bear in mind that safety is not a one-sided affair, and I know of no more sincere course that any coal company can pursue. It is not only the safety angle we look at. We also like to think of the increased tonnage and decreased cost that usually result when mines are kept in good shape, not to mention the benefits derived from having satisfied men who feel that the company they are working for is doing something to safeguard their lives.

A Safe Mine Is a Productive Mine.



Top shot down in a haulway by the safety crew preparatory to loading it out.

Here the safety clean-up crew has made clearance along a haulway and installed a safety hole. Note that the hole is given a number



Traffic arteries for strip coal—bird's-eye view of the road system at a large stripping operation.

GOOD ROADS

Essential in Strip-Mine Truck Haulage

Loads and Traffic Require Best Possible Roads for Economical Strip Haulage — Requisites Include Firm Subgrades, Good Drainage, Weatherproof Surfaces, Minimum Grades, Good Maintenance

By FRED W. RICHART
Assistant Editor, Coal Age

THE USERS of rubber-tired trucks for strip-mine haulage are of one mind on at least one point—good roads. Delays in schedules and the high cost of truck and tire maintenance have been compelling arguments in favor of doing this one thing well. No longer debated is the question: "Shall we have good roads?" The one question today is: "How can we have good roads at the lowest cost?"

Not only is a smooth, solid road that stands up under rains, freezes and thaws desirable but also the elimination of dust—dust that causes accidents by obscuring the vision of the driver and finds its way into the superfine bearings on which the truck rolls, mixing with the lubricant and cutting the life of the bearings in two. There is no universal answer. Each mine has its peculiar conditions, its local road materials and its individual problems.

Most coal operators have observed

what a small passenger automobile will do to a road not made of concrete with steel reinforcement woven into it. Excepting the black-top variety, other types of roads simply float over into the adjoining fields. Chuck holes appear everywhere, making the road surface worse than the corduroy of 60 years ago. What, then, should be expected from huge strip-mine trucks continually running over a road where the surface is not bolted down? It probably also is true that few strip-mine operators appreciate the enormous weight supported by each truck tire, as compared to the allowable weights of earth-supported buildings.

Take for example, a heavy-duty 14.00x24-in. 18-ply tire at rated air pressure of 75 lb. and a load capacity of 10,700 lb. To carry that load at the specified pressure will require a contact area of 1 sq.ft. on the road. Therefore the load on the road surface is 5¾ tons per square foot. Compare this to the allowable foundation load of 4 to 6 tons per square foot for buildings resting on thick layers of hard clay. Since there is no movement or pounding by the building to crush or displace the clay structure, it supports the building indefinitely. Any clay road subject to such traffic loads would fail quickly. Therefore, it must be concluded that truck-road material must support loads of that value without deformity and must be kept in place.

Research Helps

A great deal of experimenting has been done with road building and surface waterproofing. Most of these efforts have been based on using local material as far as possible to save the cost of importing outside material. Because of the great variety of materials, success in road building on one property does not insure success on a similar job at another property. So it turns out that truck roads are a problem of major proportions. Since pit roads are continually being abandoned and new ones built, it is necessary to learn how that job can best be done.

As in other stripping operations, general principles hold good in road building. When the builder realizes the enormous weights handled and the terrific pounding these truck roads must take, he will conclude it is a major engineering feat to build a road that will stay put. After 25 years of experimenting by 48 States, the country is just learning how to build concrete highways. So the strip miner need not be discouraged because there are still things to learn about building roads.

Standard tests for highway road materials do not meet the needs of mine truck roads. Some of these roads are short-lived and there is no time to build a series of road sections for test purposes. Experience with roads in actual stripping service is the only test that gives the desired information. It is a matter of using judgment to improve on local experience. The engineer will finally work out his own formula.

There are six basic features in a good low-maintenance high-capacity truck road: (1) a compacted, firm subgrade; (2) a deep drainage ditch on each side; (3) a road wide enough for safe passing; (4) a solid, strong foundation; (5) a waterproof road surface; (6) grades within the efficient capacity of the truck and its driving motor.

When building the subgrade two things usually are done simultaneously: making the cuts and fills to the grade stakes and digging the drainage ditches. General practice is to do this part of the work weeks or months ahead of the scheduled use of the road. This gives it time to settle. In the meantime it is used by light traffic and is smoothed with a road patrol as often as is necessary to put it in condition for the foundation. To further compact the subgrade, light trucks may be routed over it or a roller used. One such 18-ton roller was made on the job out of concrete.

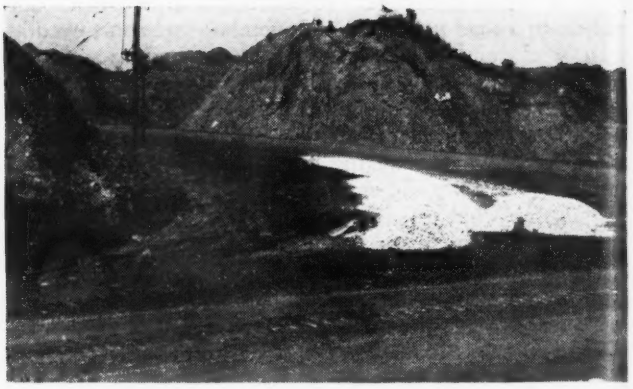
The only way to keep these heavy traffic roads in shape is to keep the subgrade and foundation dry. Deep

Coal Age CONTRIBUTION TO **LOWER MINING COSTS**

Mixer preparing stabilized base of gob, clay and bituminous compound for strip-mine road.

Power shovel for handling road material and salvaging surface compound.

Road through spoil banks surfaced with crushed rock. The value of a wide berm is indicated by its use in moving tractors.



Repair material ready for blading into a soft spot in a road serving a strip operation.

Maintenance includes sprinkling as needed.

ditches on either side are necessary to keep water from seeping under and causing failure by softening or by freezing and thawing. Deep ditches are especially necessary in low, flat terrain. Experience with roads built through spoil piles indicates that grades are likely to be steep enough for the water to run off quickly and that shallow ditches are satisfactory.

Wide Roads Helpful

At the larger mines roads are built 30 to 50 ft. wide, often with a parkway up to 10 ft. in width beyond the paved portion on each side. There are several good reasons for this, such as avoiding accidents by providing plenty of room for trucks to pass. Spreading out helps prevent the formation of ruts. As roads must have some crown to drain off falling water, there is a tendency for trucks to skid when the surface gets slippery. A wide road gives the driver a chance to save himself when a truck starts to "jack-knife." A stalled truck is coal lost.

Considering wheel load, frequency of traffic, the pounding truck roads get and the need for every truck to move on schedule to keep the coal rolling, the best foundation at a reasonable cost is none too good. It must be strong and thick enough to carry over any soft spots in the subgrade. It must prevent surface wear from getting more than "skin deep."

Waterproofing of the road surface is essential to prevent softening of the under-structure of the road from rain, snow and sleet. Fortunately, some washery gobs that are used for road foundations will seal so tightly that the water all runs off. War conditions make it difficult or impossible to get normally used waterproofing materials at the present time. The re-use of the treated surface of abandoned roads is a possibility that has been taken advantage of.

Flat roads and low grades are still in the making. Few operators have given the question the serious study it merits. Some observant operators are setting figures for maximum grades that compare favorably with rail grades. Maximum figures as low as 1½ percent have been observed. Seven percent seems to be about the maximum for ramps coming out of the pit, while some are cutting these grades to around 2 percent, asserting that increased speed and lower maintenance justify the extra road cost. The fact that trucks are able to take steep grades is beside the point. Economy lies in roads with low grades, just as in railroading.

There are two elements that enter into road building which have a vital influence on the results, regardless of how hard the engineer may try to embody these six essential features in his roads. They are Old Man Weather and the available material.

Old Man Weather does not stop to argue. He gets busy and does things. There is but one way to get along with him: that is, cater to his whims. All road construction should be done in dry, non-freezing weather. That avoids working in the mud and the sinking of roads after a thaw. Operators who have gone through the experience all warn against winter-built roads.

Fortunately, the dry, summer season also is the dull part of the year for coal production in normal times. It has the double advantage of cheap road cost and keeping men busy when otherwise they might have to be laid off. Roads built in the winter become treacherous when spring thaws soften the foundation, permitting the road surface to break up. The story is related by one strip operator that during one month a winter-built road required more than half as much weight of crushed stone as the coal hauled over it and that some parts of the road sank so much that there was a 5-ft. depth of stone laid. Old Man Weather drives a hard bargain.

Nearby Material Used

Obviously, the field is so large and the materials so varied that only a general discussion of road materials can be offered. The subgrade must be of the material through which the road runs. Roads are put where they are needed regardless of the base material over which they are built. Economics demands the use of nearby material for the foundation and surface of the road, if it can be used at all. Usually, the surfacing and waterproofing material is shipped in, but not always.

Washery gob, available at most large strip mines, is used extensively for road foundations in thicknesses from 12 to 48 in. and generally is satisfactory. In some instances the included clay is of such consistency and quantity that no waterproofing treatment is necessary. On the other hand, there are cases where it is so unsuitable that its use has to be abandoned. Burnt shale, or "red dog," has been used with success, as well as crushed stone from the property or shipped in. In some localities gravel is plentiful and is used.

The road surface is made of a variety of materials, such as gravel, crushed stone, chat, granular sand and various mixtures including clay, oil or asphaltic compounds. Crushed stone frequently is used, varying from a thin layer to 8 or 10 in. thick. A top layer of fine crushed rock or chat to fill the voids in the coarse material smooths the surface. The reason for a thin coating on a gob base is to prevent trucks skidding in wet weather. At one mine layers of granular sand, leveled and rolled, made a very smooth road. This sand was a part of the overburden and came from the spoil piles.

Surface Used Again

An interesting case of the repeated use of crushed-stone surfacing material recently came to light. In this case there was a double reason—saving the cost of new crushed stone and the reuse of the old oil as a waterproofing material. A pit had been worked out and a new one opened up. After years of use the road surface in the old pit was approximately 6 in. thick of crushed stone saturated with clay and oil. Stone being scarce and oil being out, this old road topping was scarified, scooped up with a shovel and hauled to the new pit. This was said to be the third use of this particular material and "plenty good for a wartime road."

In prewar times, dressings of road oils were used for waterproofing but restrictions have forced a more extended use of any available asphaltic compound. A light dressing of sand or stone chips helps to keep the waterproofing in place and reduces skidding in snowy and rainy weather.

Any highway bridges that happen to be on a stripping property are not likely to be strong enough for such traffic. In case they are, the floor elevation should be 2 or 3 ft. below the grade of the road, so the road foundation can be run right across the bridge. It is for the same reason railroads run the track ballast across a trestle or bridge—prevents low spots at the ends of the bridge.

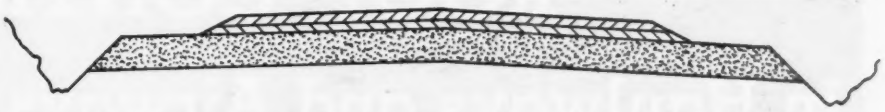
Culverts are better than bridges for mine-truck roads; they permit making a solid continuous roadway. The top of the culvert should be 3 ft. or more below the road surface.

Most road maintenance involves a water sprinkler and a road patrol used every day the mine works. A road is kept smooth by never letting the surface start to break. There is some wear. That is made up from material piled conveniently or dropped on the offending spot, to be bladed in by the road patrol.

A waterproofing that serves through the summer, when sunshine and heat quickly dry the leavings of a rain, may fail in winter. Weeks of rain, snow and slush may break through threadbare waterproofing and a freeze break the surface. A fall surface dressing is sane preventive maintenance.

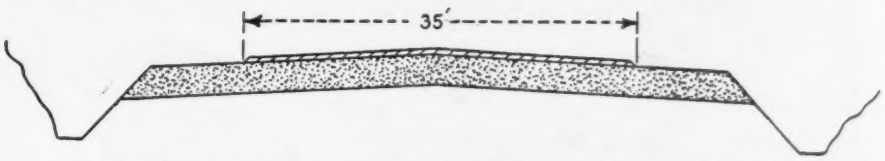
One mine that did this in the fall of 1943 had its roads come through the season in fine shape. That job was done with two applications of emulsified asphalt, each held down with a thin layer of stone chips. Each application consisted of one-third gallon of "Bitucote" and 30 lb. of ¼x¼-in. stone chips per square yard.

STRIP ROADS PROVED IN SERVICE

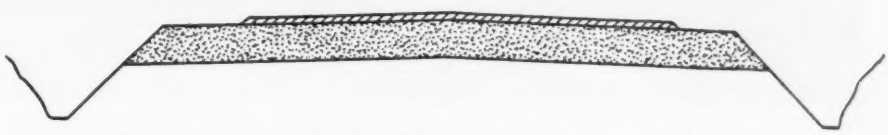


Characterized by smoothness—two 6-in. layers of granular sand from spoil pile, each leveled with road patrol, rolled and wet down. The sand contains some clay. The surface is finished with a thin layer of stone chips treated with two sprayings of road oil.

Maintenance—2 mills per ton for 30-ton trucks; 4 mills for 15 tonners. Base, 18 in. of washery gob. Surface, 10 in. of crushed limestone rolled down to 7 in., with calcium chloride added.



For 25-ton trucks—18 to 24 in. of washery gob surfaced with 4 in. of 2x4-in. crushed stone to prevent skidding in wet weather. This particular gob requires no waterproofing. Maintained with water sprinkler and road patrol. The gob is hauled out in 25-ton drop-bottom semi-trailer. One load makes a windrow 90 ft. long when discharged.



For 70- and 80-ton trucks—subgrade of blue shale up to 24 in. in thickness, rolled down with empty trucks and then bladed and the holes filled. The surface is 4 in. of crushed rock from a local plant, bladed and oiled (pre-war construction). Oiled rock from abandoned roads is now recovered and used to surface the new roads now being built.

For 25-ton trucks—subgrade of 13 to 24 in. of waste and oil through a mixer, spread with a grader, compressed with a "sheep's foot" and compacted with a 5-ton roller. The 6-in. base is stabilized bituminous mix made of gob, 15 percent clay, water and the same oil as is used in the subgrade with the same mixing, spreading and compacting. The top waterproofing coat is a heavy spray of emulsified asphalt from a tank truck followed by a ½-in. layer of ¼x½-in. stone chips, rolled, with a repeat layer of asphalt and ships, also rolled.

ROOF CONTROL

In Haulways and Airways by Guniting*

By sealing roof and ribs, gunite provides economical support in long-lived entries at Hanna mines.

Gunite Applications Include Sealing Roofs and Ribs and Lining Substations, Etc., at Hanna—Where Entries Have a Life of Over Five Years, Studies Indicate Gunite Is Cheaper Than Timbering

By JAMES HYSLOP
Vice President, Hanna Coal Co.
St. Clairsville, Ohio

THE PITTSBURGH NO. 8 seam in eastern Ohio averages 5 ft. in thickness and lies practically level. Immediately above the coal is a layer of drawslate, which in our mines will average approximately 12 in. in thickness, although it varies from 0 to 36 in. This drawslate has practically no weight-carrying strength and is shot down or allowed to fall as mining progresses. Above the slate is a stratum of roof coal varying in thickness from 0 to 24 in. The roof coal is of varying strength. At some places in some mines it will stand in entries for the life of a working section; less frequently will it stand for the life of a secondary haulage entry. More often it is of such a character that it must be supported by steel crossbars. In many cases the roof coal is so weak that we find it necessary to place steel crossbars on 4½-ft. centers to hold it.

Because of the variable and unpredictable character of the roof coal, our policy generally is to provide timbering adequate to take care of the roof conditions we anticipate we shall encounter, unless, of course, it is anticipated that a certain area may have moderately good roof. Above the roof coal is a mass of shale, soapstone and clay, varying in thickness from 5 to 8 ft. Above this is a stratum of hard blue limestone which provides a permanent roof.

Where entries are to be used less than five years the roof usually can be supported by steel or wood crossbars, but if they are to be used for a longer time roof support is a serious problem. All the roof material below the limestone disintegrates when exposed to air or moisture and in a few years falls out between and over the crossbars. When this material is removed for a considerable distance above the coal the ribs scale, which, in turn, contributes to a further collapse of the roof. As the height of the entry increases, the cost of timbering is greatly increased.

Approximately ten years ago the Hanna Coal Co. started the use of gunite on its long-life haulage entries. Gunite is a mixture of sand and cement which is placed in the hopper of a so-called "Cement Gun" machine and blown dry through a length of

* Abstract of a paper entitled "Control of Mine Roof in Haulageways and Main Aircourses," presented at the June meeting of the Mine Inspectors' Institute of America, Charleston, W. Va.

hose to the nozzle, where it is combined with sufficient water to produce proper chemical hydration of the cement. The impact of the material results in a good adhesion.

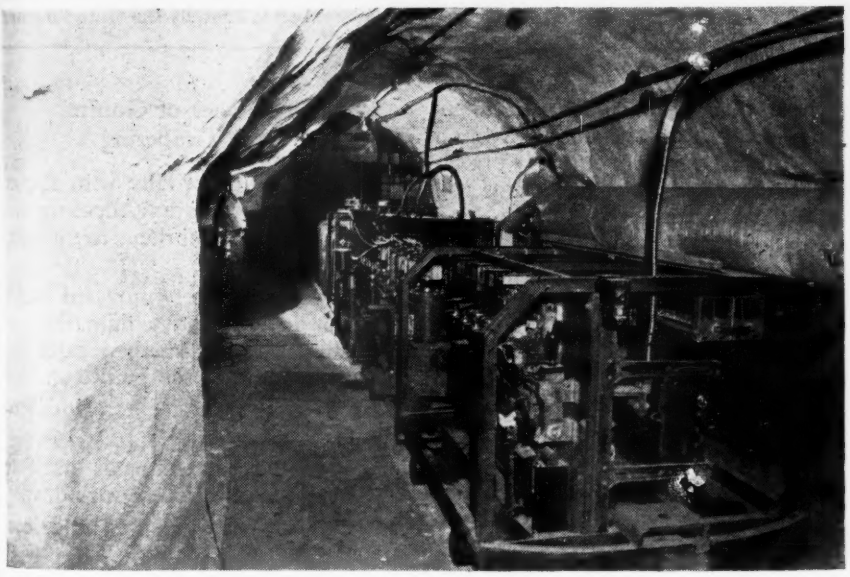
Uses of Gunite

1. *As a Sealing Agent for Roof and Ribs on Return Air*—Gunite has found its greatest application in our mines in the 1-in. applications we have made to seal the roof and ribs from contact with the atmosphere. This type of gunite application affords practically no structural strength but merely acts as a seal, preventing degradation from contact with the air. Thus, it does not serve as a timber but rather obviates the necessity for timbering. We have used this method of applying gunite to entries on the return air. We have found that its use on intake air entries has not been successful because of the changes in temperature and humidity, which cause the gunite to crack and disintegrate. This application can be successfully used, however, on intake-air entries inby the point where the air reaches and maintains a constant mine temperature. In all cases we have applied the gunite after shooting down all material to the limestone roof and scaling off all loose material from the limestone top and the ribs.

2. *As a Sealing Agent for Roof and Ribs on Intake Air*—As noted previously, the ordinary 1-in. application of gunite is not satisfactory for entries on the intake air outby the point where the air reaches mine temperature and humidity. For this type of work it has been found that a 2-in. application of gunite, reinforced with 4x4 No. 8 wire mesh, has acquitted itself very nicely and, in most cases where it has been used, no failures have occurred over a period of several years. We ourselves have had little experience with this application.

3. *As a Sealing Agent for Roof*—Satisfactory results occasionally have been attained from application of gunite to the normal mine roof where such roof is of a firm structure and free from breaks. We have never used this particular application for two primary reasons: (1) Our roof coal generally is not strong enough to support the weight imposed upon it without the use of steel crossbars; (2) the advantage of a large-perimeter entry in the improved ventilation afforded.

4. *Lining for Substation Rooms, etc.*—We have successfully used reinforced gunite for lining substation rooms, underground machine shops, air shafts, etc. For this type of application we use a 2-in. coating, reinforced with wire mesh. Guniting of these permanent or semi-permanent places provides a fireproof room which is not subject to deterioration and is practically impervious to water.



Fireproofing supplements support in use of gunite for substation rooms, such as that shown here, underground machine shops, air shafts, etc.

Preparation of Surface and Application of Gunite

Preparation of Surface—The preparation of the surface to be gunited is identical for Applications 1, 2 and 4 noted above. All material up to the limestone roof is shot down and removed. The roof is scaled to at least a flat arch and the gunite is applied from the bottom of the coal to the top, across the roof, and down to the bottom of the coal on the far side of the entry. Our experience is that, with a 10-ft. entry this necessitates coating from 25 to 30 ft. of the perimeter for a cross-sectional area of about 75 sq.ft. It is of prime importance that the scaling be done immediately prior to the actual application of the gunite, as the atmosphere will cause the exposed face to start disintegrating if it is not sealed right away. If more than a shift elapses between scaling and application of the gunite, it becomes necessary to perform the scaling operation again; in any event, it is advisable to have the crew applying the gunite check the surface to be coated and remove any material that may have become loosened since the scaling was done.

Very little preparation is required for Application 3. It should be noted that application of the gunite in this case must be made almost simultaneously with the driving of the entry, else sufficient degradation of the roof is likely to occur to make this type of application ineffective. We understand that where this method has been employed it is found advisable to extend the gunite coating approximately 2 ft. down each rib to insure a good seal of the roof.

Application of Plain Gunite—A dry surface is desirable for guniting. Therefore it is advisable to plan this work in so far as possible for the winter months when the relative humidity of the mine is low.

One part of portland cement to three parts of sand are well mixed and placed in the feed hopper of the Cement-Gun machine. This mixture is forced through the hose of the Cement Gun to the nozzle by compressed air. At the nozzle this mixture is combined with a sufficient quantity of water to effect proper hydration (approximately 300 gal. of water is required for each 70 to 75 sacks of cement). We formerly used sand with a top size of $\frac{1}{8}$ in., specifying that it was to be 75 percent minus $\frac{1}{8}$ in. We have, however, found that a coarser sand results in greater strength, and we are now using a sand with top size of $\frac{1}{4}$ in., with 50 percent of $\frac{1}{8}$x$\frac{1}{4}$-in. material. The surface to be coated is first given a flash coat of approximately $\frac{1}{4}$ in. This $\frac{1}{4}$-in. coating is applied to seal the exposed surface from the action of the air as quickly as possible. The remaining $\frac{3}{4}$-in. coat is then applied later; usually the following shift.

Application of Reinforced Gunite—

Reinforced gunite is applied in three separate coats. The first coat is applied as soon after scaling as possible. When the second coat is applied, tie wires are shot in. These are short pieces of twisted wire, one end of which is covered with the second coat of gunite. After this hardens, the 4x4 wire mesh is tied to the protruding end of the wires, which, incidentally, are spaced approximately 1 ft. apart. The third coat of gunite is applied covering the wire mesh. The total thickness of the completed application is approximately 2 in.

Guniting Crew

The majority of our gunite applications have been by contract. The contractor used a crew of six men: 1 gunman, 1 nozzleman, 1 foreman and 3 mixers. All the preparation work was done ahead of this application crew, so it was expected that the crew could devote its entire time to the application of the gunite, and a large square-footage per shift was expected of it. However, for various reasons (breakdowns, etc.) it frequently happened that the gunite application crew would fall several shifts behind the preparation crew. In its efforts to maintain its daily quota of square footage, little or no attention was paid to the re-scaling made necessary by the longer exposure of the open face of the entry to the atmosphere, resulting in failures in the gunite and requiring patching to be done. We decided to experiment with a smaller crew (four men) which would give special attention to the condition of the surface to be gunited and which also would be required to do the final re-scaling before applying the gunite. We have found that the gunite applied by this small crew has required less patching because a better job of scaling had been done prior to the application of the gunite, while this crew applies as much gunite per shift as the six-man crew.

Guniting Equipment

Our equipment for guniting includes:

1 air compressor (310 c.f.m.)
1 Cement Gun machine
1 water tank (300 gal. capacity)
200 ft. material hose
250 ft. water hose
1 ¼-in. x 3 x 6-ft. screen
Mixing boards, guards, chutes, etc.

The total cost of this equipment new will approximate $5,000.

Cost of Guniting

Approximate costs for guniting, both plain and reinforced, contract and company application, are shown in Table I. It must be borne in mind that these costs for similar work in other seams and other conditions will vary. All labor figures shown have been adjusted to the present wage scale, and include travel time. No sixth-day work, however, is included in these costs. The prices for contract application of gunite are those in effect currently, which for plain gunite is $0.025 per square foot above that paid by us when most of our contract work was done.

Table I—Guniting Costs

	Cost per Square Foot			
	Plain Gunite		Reinforced Gunite	
	Contract Application	Company Application	Contract Application	Company Application
Shooting and scaling	$0.039	$0.039	$0.039	$0.039
Loading	0.029	0.029	0.029	0.029
Haulage	0.027	0.027	0.027	0.027
Application	0.090	0.041	0.210	0.105
Cement	0.042	0.028	0.084	0.056
Sand	0.015	0.010	0.030	0.020
Reinforcing material	.....	.....	0.030	0.030
Depreciation and power	.....	0.006	.....	0.012
Total	$0.242	$0.180	$0.449	$0.318
Labor expense (10 percent)	0.010	0.014	0.010	0.020
Grand total	$0.252	$0.194	$0.459	$0.338

1. Costs for scaling, loading and haulage shown above are for an entry with an average perimeter of 31.8 ft., the entry being 12 ft. wide and arched.

2. It will be noted that there is a discrepancy between the cost of the cement and sand as between contract and company application. The only explanation we can offer for this is the fact that we experienced considerably more wastage of materials on the contract basis than we do when the application is made ourselves.

3. We have never applied any reinforced gunite except by contract. Therefore the costs we have shown are theoretical. We have doubled the labor for application and have added $0.023 for labor for placing the reinforcing materials. We have doubled the per-square-foot cost of cement and sand.

4. We have not included in these costs any charges for supervision. We do not assign a foreman full time to this work. The supervision is done by the mine foreman

Guniting Versus Timbering

Engineering studies in our mines have indicated that if an entry has a projected active life of more than five years the application of gunite is more economical than the installation and maintenance of timbering.

We have found that where gunite has been properly applied it fulfills exceptionally well the purpose for which it was intended—the sealing of the strata from the disintegrating effect of the atmosphere. It must be expected, of course, that a certain amount of patching will be necessary from time to time. Records of maintenance which we have kept only for the past 2½ years indicate that our total patching cost per linear foot during that entire period amounted to $0.14. More than half of this gunite has been in place for periods exceeding eight years.

Advantages of Gunite Over Timbering

1. Elimination of falls, with the attendant costs of cleaning them up and consequent interruption to mining operations.

2. Additional safety provided by additional height and elimination of roof-fall hazard, and by the greater visibility provided by the gunite surface.

3. Fireproof surface provided by gunite.

4. Gunited surface lends itself to satisfactory application of rock dust.

5. Provides cleaner entry because of absence of falls.

6. More area and a smoother surface provided for ventilating currents.

7. Decreased maintenance cost.

Statistical Information

The following figures are based on the application of gunite to 800 linear feet of entry:

Number of men on crew, 4.
Average perimeter covered, 30 ft
Thickness of application, 1 in.
Average square-foot coverage per 7-hour shift, 789.
Average square-foot coverage per sack of cement, 20.17.
Cost of gunite in place, exclusive of preparation, $2.457 per linear foot.
We would expect under normal labor conditions quite a substantial improvement in efficiency.

EXIDE ANNOUNCES A NEW MOTIVE POWER BATTERY

the EXIDE-POWERCLAD

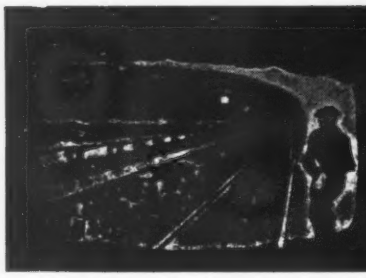
MADE AVAILABLE NOW to relieve existing shortages, and to supplement the Exide-Ironclad, which will continue at peak production

FOR 34 YEARS Exide-Ironclads have been recognized as the world's most dependable and efficient motive power battery. As a natural consequence the demand for them has grown to a point where production has now reached its peak. An increase will not be possible for some time to come. To relieve this shortage another truly great motive power battery has been added to the Exide line.

This new battery, the Exide-Powerclad, is not a stop-gap—not a "Victory" model—nor a composite of other battery parts. It is an entirely new battery—a result of approximately 12 years of specific and definite research, conducted for the purpose of developing a high-quality, flat-plate battery which will meet the most exacting needs encountered in motive power service. Its essential parts are of new, improved design, and are made exclusively for the Exide-Powerclad.

Based on extensive laboratory and service tests, we can assure motive power operators that performance and power costs will compare favorably with those of Exide-Ironclads. For further particulars write to Exide.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32
Exide Batteries of Canada, Limited, Toronto



THE FOREMEN'S FORUM

Most of Year Slope Ventilates Itself

Usually Lightened by Mine Heat, Methane and Water Vapor, Return Air Hustles Up a Slope to Surface, but on Hot Days Slope Opposes Mine Fan

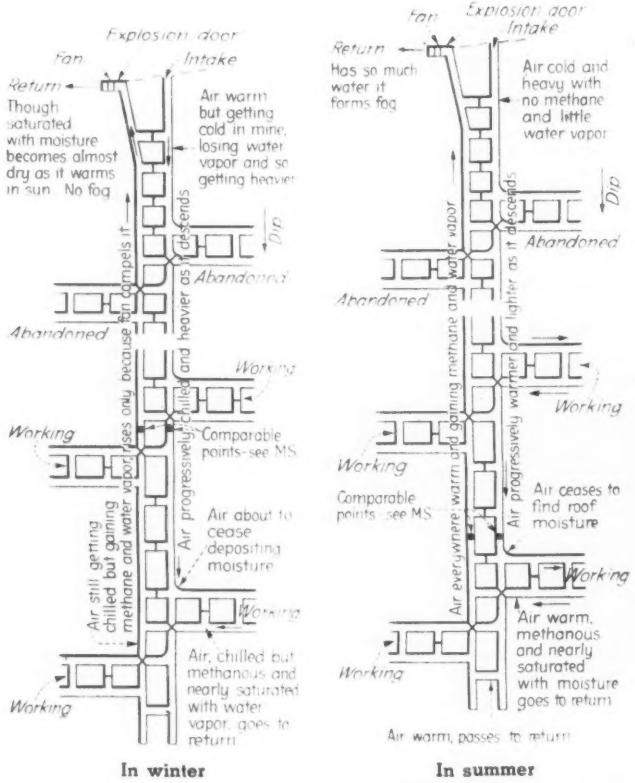
A SLOPE MINE has a tricky ventilation which depends partly on the relation between the temperature of the air above ground and the temperature of the interior of the mine and partly on the work of the mine fan, but undoubtedly, in the course of a calendar year, a slope mine can be ventilated with less power than a drift mine, even if with more difficulty.

Slope in Winter—In the *winter*, the air above ground is cold and therefore heavy. As the air enters the mine, it gets warm and therefore tends to become lighter, but nowhere is it so warm as it is after it has traversed the several mine workings at or near the lowest point in the slope and is about to return direct to the surface. That warmest of air does not enter the intake at all but goes direct to the main return.

By the time the air has traveled through the live workings it has been warmed (1) by its friction within itself and against the walls, (2) by its compression, for the air is compressed by the greater column of air above it, and compression always heats the material compressed, as note the air in an air compressor; (3) by the heat of the men and animals in the workings, (4) by the heat generated by electrical currents, (5) by the work done by the machines, (6) by the residual heat of the measures, (7) by the heat transmitted from the central fires of the earth, (8) by the heat of the physical and chemical changes in the coal bed, (9) by the downward movement of the rocks, their stressing and actual rock falls and (10) by the burning in lamps of both oil and methane. The methane may not be in sufficient quantity to form a gas cap but it will burn nevertheless.

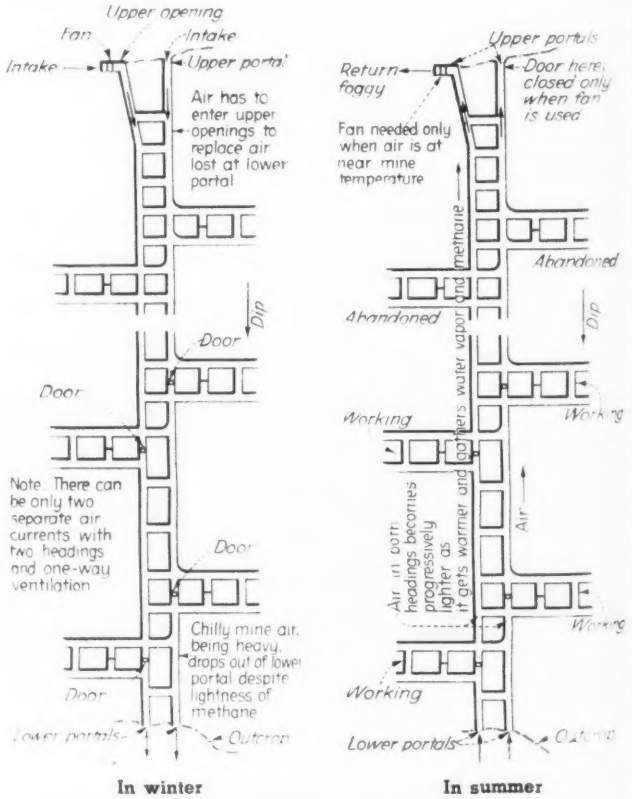
For all its increase in temperature, the air sometimes may become heavier, because it is compressed, but what really counts is that when it comes up toward the surface its average weight per square foot at any point will be less than that at a "comparable point" on the downward journey, because it will be warmer than it was at that point on the descent and will be under equal pressure. By "comparable points" are meant points at the same distance from the surface.

The intake air also has gained methane,


Explosion door
Fan
Intake
Return
Though saturated with moisture becomes almost dry as it warms in sun. No fog
Air warm but getting cold in mine, losing water vapor and so getting heavier
Dip
Abandoned
Abandoned
Working
Working
Air progressively chilled and heavier as it descends
Comparable points-see MS
Air about to cease depositing moisture
Air still getting chilled but gaining methane and water vapor
Working
Air, chilled but methanous and nearly saturated with water vapor, goes to return
Working
Fan
Explosion door
Intake
Return
Has so much water it forms fog
Air cold and heavy with no methane and little water vapor
Dip
Abandoned
Abandoned
Air progressively warmer and lighter as it ascends
Working
Working
Air ever warmer and gaining methane and water vapor
Comparable points-see MS
Air ceases to find roof moisture
Working
Air warm, methanous and nearly saturated with moisture goes to return
Working
Air warm, passes to return

In winter **In summer**

Fig. 1—Two-way or loop-ventilated slope.

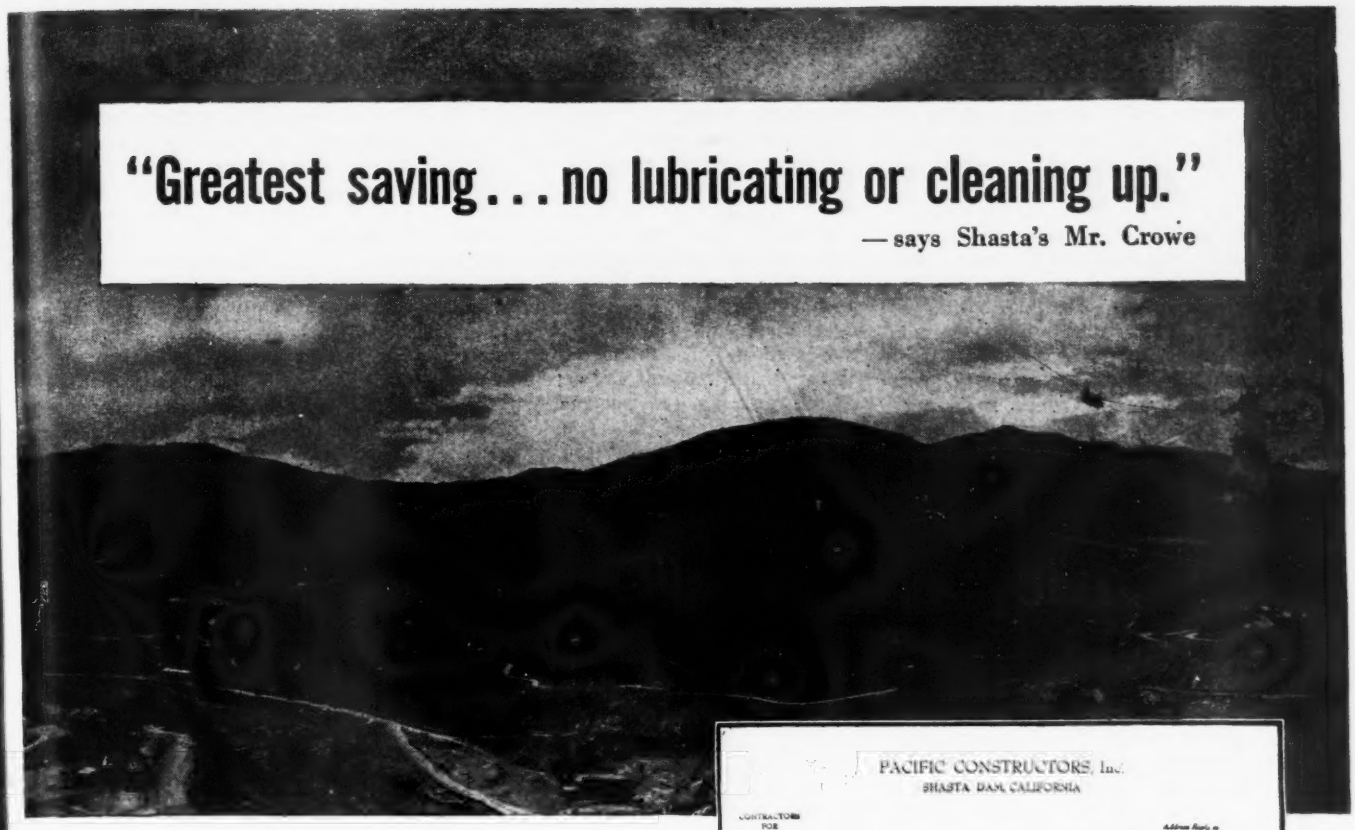


In winter **In summer**

Fig. 2—One-way or through-ventilated slope.

"Greatest saving... no lubricating or cleaning up."

— says Shasta's Mr. Crowe



THE last link in the 10-mile Shasta Dam conveying system is a mile and a half unit made by the Conveyor Company of Los Angeles, using 17,500 New Departure Self-Sealed Ball Bearings of two types.

For nearly four years this system has handled 13 million tons of rock as big as 6 inches in diameter.

The satisfactory service obtained is proof that these self-sealed "Lubricated-for-life" ball bearings are not only equal to the job but effect great savings in time and lubricant.

New Departure engineers will be glad to suggest how you may use these ball bearings to your own advantage, when they are again available. Ask for Booklet C.

New Departure, Division of General Motors Corporation, Bristol, Connecticut. Los Angeles, Chicago and Detroit.

3281

PACIFIC CONSTRUCTORS, Inc.
SHASTA DAM, CALIFORNIA

CONTRACTORS FOR SHASTA DAM

Shasta Dam, California
January 18, 1944

The Conveyor Co.
3260 E. Slauson Avenue
Los Angeles, California

Gentlemen:- Attention: Mr. W.E.Sane, President.

As you know, our use of the troughing conveyor system at Shasta Dam using New Departure Conveyor Roll bearings and installed by your company, is about completed.

When this job was being discussed at the start, we questioned the use of New Departure Sealed Conveyor bearings in service on 36 inch belts carrying six inch rock at 450 feet per minute.

Considering that even in the building of Boulder Dam we had not had as large a conveyor problem, we were reluctant to experiment any more than we had to in designing equipment for Shasta Dam.

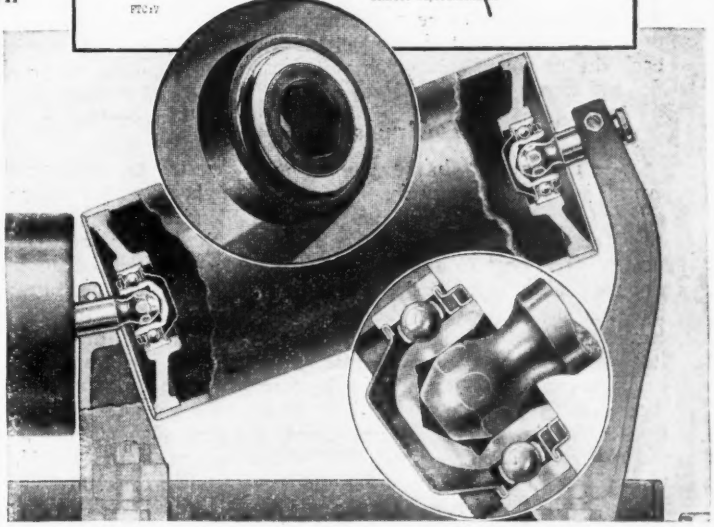
Now, after nearly four years with extremely low and satisfactory maintenance costs, approximately 13,000,000 tons have been handled with this equipment.

We know that the greatest saving in the use of this design was in the elimination of lubricating and of cleaning up after lubricating, made possible by the use of sealed bearings.

It is a pleasure to advise you that your troughing idlers using New Departure Sealed bearings have been very satisfactory.

Yours very truly
PACIFIC CONSTRUCTORS, INC.
By G. G. Crowe
General Superintendent

FTC:V



Bearings are lubricated for life. Shafts and bearings designed to prevent cramping or slippage. Units easily set up.

NEW DEPARTURE

BALL BEARINGS

Nothing Rolls Like a Ball

and that makes it light. This gas it gets mostly in the active workings from breaking down the coal or entering parts of the coal bed not as yet drained of their methane, so it lightens the return air rather than the intake air.

On the surface also the air probably does not hold nearly as much water vapor as it *could* carry with it, if such water were presented to it; that is, it is not nearly saturated. When it gets near the bottom of the slope and has run through the side headings, and (1) past walls and roof that are wet with summer sweat, (2) past streams of mine water which are warmer than the entering air and fairly steam as they travel, (3) past coal which has what is known as "bed moisture," (4) past green timber and (5) past steaming and respiring animals and men, it has acquired nearly all the water it can handle. You will recall how the mines dry up in the winter. The air sucks up the water from them, makes them dry and makes itself wet by the same token. You know also that clouds and steam rise, showing they are light, though it is true that clouds fall when they are full of condensed water vapor—that is, full of liquid water (rain drops)—and that steam rises partly because it is hot, but it is a fact nevertheless that water vapor *is* actually lighter than air. For all these reasons—heat, methane and moisture—the air is much lighter in the return than in the intake. We might term these the "lifting trio."

However, three things get into air in the workings and make it heavier, namely: (1) coal dust, (2) rock dust and (3) carbon dioxide; these might be termed the "depressing trio." Much of the dust settles out after a while, but, so long and as far as it floats—and some of it floats to the return mine portal and beyond—it tends nevertheless to make the air heavier, but not as much as it is made light by the methane and water vapor and above all by the heat of the mine. All these conditions, except dust and dioxide, make the air in the return airway lighter at all comparable points than the air in the intake airway, and this difference causes considerable air travel in the winter. The quantity of carbon dioxide generally is grossly overestimated. Blackdamp rarely is heavier than air. Change of pressure with depth does not count, for it lightens and cools the air as it rises as much as it densifies and warms the air as it descends.

Summer Doldrums

Slope in Summer—In the summer, however, it is a different story, for the air above ground is warm and the mine is colder than the air at the surface, so the air gets heavier as it goes to the bottom of the slope, especially near the slope bottom, for by that time it is cooled almost to mine temperature. As it comes into the mine it loses its moisture to the walls, for at the lower temperature of the mine it becomes supersaturated and can't hold all its moisture at the lower temperatures which it successively encounters. Losing that moisture makes it heavier, for water vapor is lighter than air, and it gains coal and rock dust, at least for a while, and this makes it heavy. On the other hand, it gains methane. In all, its weight in the summer is sure to be more nearly the same at all comparable points in the return and intake than it was when it came in during the winter as cold heavy air and left as warm light air, because now it comes in as warm light air and leaves as cold heavy air. Two of the lifting trio—methane and moisture—are still giving a boost to the air in the return, and the third, heat, in the main is helping the enemy and opposing the fan.

Consequently, in summer the existence of a ventilating current will depend largely on the work that the fan does.

Night Air Helps Fan—In the heat of the summer day the fan will have not only to make the air travel but also to fight the natural opposing ventilation, and in the cool of the summer night, when the mine and surface temperatures are more nearly equal, the fan may have to do all the work of making the air travel, just as it does in a drift mine, but it will not have to labor against natural ventilation.

In winter it will be possible to rely mostly on favoring natural ventilation, and the fan will receive maximum aid during the winter night because the entering air will be bitterly cold and very heavy. It will accomplish its job easily during the day with the help of the cold air, but not so easily as with below-zero nights.

Equable Drift

Drift Mine Stagnates—In the drift mine, on the other hand, there is no difference of elevation and, therefore, no "stack effect" and all the changes in temperature, water vapor, methane and dust percentage are entirely without influence. You always know what has to be met—never more, never less—except that air pressures on the surface occur that change the pressures below and increase or diminish the travel of methane. When the pressures fall, they make it necessary to increase the volume of air in order to free the roads and working faces of that menace. Moreover, the temperature of the goaf always is higher than that of the return air; sometimes in Lehigh Navigation mines 125 deg. F. The methane and goaf heat don't lend a hand to the foreman of a drift mine as they do to a foreman of a slope mine, for they do not increase the air flow automatically whenever more methane has to be moved as they do in the rival shaft mine.

The ventilation expense in slopes decreases when the air becomes naturally heated on entering a mine and increases when the air becomes naturally cooled under the same condition. Therefore, if the average annual temperature of a mine region is less than the average annual return-air temperature of any slope mine in that region, the air more frequently will be heated than cooled on entering the mine, and the cost of ventilation will be less in that slope mine than it would be if it were a drift mine. Return-air temperatures of many mines in Illinois can be obtained from the U. S. Bureau of Mines, Bulletin 83, on "The Humidity of Mine Air," by R. Y. Williams. He records none above 79.33 deg. F. (Big Muddy Mine, Williamson County, as of date May 4, 1914, and the temperature of the return Feb. 9 was 75 deg. F.).

The temperature of the return in slope mines may easily run to 85 deg. F. The average annual surface temperature at Springfield, Sangamon Co., Ill., is 50 deg. F., according to the Encyclopaedia Britannica, 14th edition, vol. 12, p. 86. In vol. 17, p. 479, the same authority gives the annual average temperature of the "center of Pennsylvania" as 50 deg. F. Thus, the temperature of the air of the mine would average higher than the temperature of the surface in both those States, if the interior temperature was 85 deg. F. or even 70 deg. F. So a slope mine should be more economical in the use of ventilating power than a drift mine, entirely overlooking the effect of methane and water vapor, which both would tend to clinch that argument.

However, in a warm country, the contention would not hold so surely, though there mine temperatures themselves would be higher. In fact, mine temperatures and return-air temperatures always are higher than annual average surface temperatures, because the mine is a source of heat.

One-Way Ventilation—When a slope, as sometimes, but rarely, happens, goes from outcrop to outcrop, dipping all the way in one direction with a portal or other opening at both ends, the stack effect is considerable. The heavy air of winter enters the mine at the low portal and is warmed and leaves with methane and water vapor at the high portal. In the summer, on the other hand, the heavy air of the mine drops out of the low portal and the light air takes its place, entering by the high portal. The light air is then cooled, and in turn leaves by the low portal.

Thus, the air may reverse during the day or at night, with a neutral point where mine and surface are at the same temperature. When the natural current tends to reverse, the fan will have to provide all the air. It would be possible to reverse the fan to suit the natural ventilation, but it is well to keep the air coursing in one direction, unless perhaps a change be made at the beginning of the hot spell in the summer and of the cold spell in the winter.

•

Cutting Into a Neighboring Mine

When one active mine barges into another, the pressures of the air in the two mines probably will not be the same at the point of intersection. As a result, foul or explosive air from idle workings may pour, with disastrous results, into the mine which has the lower pressure at that point. The air thus entering may be so full of methane or so mixed with carbon dioxide that it will not be explosive until after it has mingled with the purer air of the intersected or intersecting mine. A mine having an exhaust fan always is in condition to receive foul or explosive air from an idle but open mine, for the pressure of the latter will be everywhere barometric.

THE NATIONAL DEBT—
and Your Postwar Job

Coming upon the heels of a ruinous ten-ear depression, this war has once more made clear to us that the strength of our country epends upon our ability and willingness to roduce. Until the world conflict eclipsed he depression, we saw what failure to use ur productive capacity can do—even to a ountry potentially as rich as ours.

The stark reality of war finally shocked us ut of our economic lethargy. The necessity f supplying our Armed Forces with almost nlimited quantities of goods unleashed our nventive genius and revealed to us our real apacity to produce. It indicated what our tandard of living might be if, in time of eace, we used our full productive capacity.

Today we are producing more than all he other nations combined, half again as uch as in 1940. Today our production is suring victory to our fighting men.

But what of the future?

Already our national debt has reached stronomical proportions, and it is going igher. The depression years' fear of insecur-y that all but paralyzed our spirit of enter-rise, our inventive genius, and our natural stinct for expansion, appears likely to re-rn promptly if industrial activity again is rtailed for long because of unwise public olicies.

This war is being fought to make men ee. But our economy cannot be kept free rough military conquest alone. There is nother responsibility which we on the me front cannot avoid any more than we n build walls around our future. That is the problem created by our frightening public debt.

This is a two hundred billion dollar war. It affects the lives of every one of us. At the end of this war, the public debt of the United States will be at least ten times the twenty-five billion dollars that it was at the end of the first World War. It will be almost twice the present annual national income of the country. The interest charge alone will be about 4 per cent of the national income. If the burden were spread evenly, interest alone would take at least $80.00 of every worker's income per year, or approximately $1.60 out of each and every weekly pay check.

Some people fear that the heavy taxes required by the debt will keep the country poor by obstructing employment and limiting the output of goods.

Others believe that the size of the debt does not matter because we owe it to ourselves. They reason that if A is taxed $100 to pay $100 interest to B, A has $100 less to spend and B has $100 more, but both together have the same amount. They, therefore, hold that the demand for goods and the volume of employment remain unchanged.

Which view is correct?

Is our huge debt bound to be a crushing burden which limits employment and lowers the nation's standard of living, or will it simply redistribute income? May the public debt under certain conditions even be used to help increase employment and raise our living standards?

Most people, rich and poor alike, find it difficult to believe that the national debt "just doesn't matter". They know that the interest alone on this huge debt will be almost equal to the total amount of taxes ever raised before by the government for all purposes in any peacetime year. They find it difficult to follow the kind of reasoning that suggests increasing the already mammoth debt year by year in order to maintain full production and employment. They fail to see how this "debt raising" can go on indefinitely.

On the other hand, the records show that other nations have more than once successfully managed even greater debt burdens than will confront the United States after the present war. The interest on the British debt after the Napoleonic Wars was nearly 8 per cent of the national income, and after the first World War was over 7 per cent. But despite heavy taxes and some unfortunate mistakes in economic policy (such as restoring the prewar pound), per capita real income in Great Britain rose about 31 per cent between 1920 and 1929. In fact, it rose as rapidly as it did in the United States. The world depression was far less severe in Britain than it was in the United States; and, by 1936, when industrial production still was 6 per cent below 1929 in the United States, it was nearly 16 per cent above 1929 in Britain. Britain's heavy debt burden proved less of a handicap to her during the depression than our weak banking system did to us.

Whether the debt becomes a crushing burden or whether we use it to further our progress depends upon who holds the debt and how the money is raised to pay the interest.

Here are the important possibilities:

1. If the expenses of the government, including the interest on the debt, are met largely by heavy taxes upon business profits—i.e., by taxes upon job-giving—then they will reduce employment, output, and our standard of living, regardless of who holds the debt. Heavy taxes on profits prevent enterprise from expanding current operations or enlarging the capacity of its plants, unless the prospects for profit seem certain and the prospects for loss are slim. Hence the jobs that might be created to take advantage of long chances will not come into existence, and the country as a whole will be poorer.
2. If the expenses of the government are met largely by stiff surtaxes upon the incomes of persons who do a considerable amount of saving, and the debt is, in the main, owned by millions of small investors, then the net effect of the debt upon the volume of employment and output will be fairly neutral. The stiff surtaxes, while reducing the savings of the well-to-do, will cause them to avoid risky investments and to hold part of the savings of each year in the form of cash. This will limit the demand for goods and the volume of employment. But this effect will be partially offset if millions of small holders of the debt are led by their savings in government bonds to spend a larger part of their current income.
3. If the expenses of the government are met largely by sales taxes or other taxes on small incomes, and if the debt is held largely by the well-to-do or by business corporations, then the effect of the debt will be unfavorable to employment and production. The limitation to the spending power of the small-income group will reduce the volume of investment opportunities, and the transfer of income to the well-to-do will increase the volume of investment-seeking funds.
4. If the debt is widely distributed among millions of small holders, and the expenses of the government are met largely by taxes on individuals, if substantial exemptions from surtaxes are given for all income invested in new plant or equipment, and if there are liberal offsets for losses, then the debt will help increase employment and raise the standard of living. The millions of small holders will gain a sense of security from their accumulated savings and hence be encouraged to spend a larger portion of their current incomes. The stiff surtaxes will reduce the savings of the well-to-do; liberal exemptions for income put into new plant and equipment, and generous treatment of losses, will cause the well-to-do to invest their savings in job-giving enterprise rather than to hold them in idle cash.

But what is the situation today?

Today, non-banking corporations own nearly half of the Federal debt, commercial banks about one-fourth, and individuals less than one-fourth. Not more, and probably less, than one-tenth of the debt is held by persons earning less than $5,000—although these persons receive three-fourths of all income.

Today, about half of the revenues of the Federal government come largely from taxes which must be regarded as ***taxes upon the creation of new jobs.*** If these conditions continue, we may be sure that the debt will be a disastrous obstacle to a rising standard of living after the war.

What can be done to change this situation?

To begin with, vigorous steps should be taken to get much more of the debt into the hands of individuals, particularly of those in the small-income group. During the last three years, the incomes of individuals, after taxes, have exceeded the supply of consumer goods by $74.2 billion. In other words, individuals have been compelled, by the sheer scarcity of goods, to save over $74 billion. Of this amount, only $27.4 billion, or 37 cents out of every dollar, has gone into government bonds. Indeed, individuals have saved more in the form of cash and bank deposits than in the form of government bonds. The sale of war bonds to individuals was most disappointing in the recent drive. It was so disappointing, in fact, that I would favor a special drive ***for individuals only,*** to be scheduled before the next general drive. During 1944, when the supplies of civilian goods are severely restricted and when the fighting is at its climax, the Treasury will have its best opportunity to persuade individuals to buy more bonds. This opportunity should not be lost. An increase of at least twenty-five billion should be the goal for the next year. Every citizen should be made to understand that by buying war bonds now, he is not only helping to win the war; he is helping to make possible a more prosperous and stable America after the war.

The efforts to sell bonds to individuals should be vigorously continued throughout the shift from war production to civilian production. During this period, corporations which, up to now, have been the largest buyers of government bonds, will need all their depreciation allowances and undistributed profits to pay for new equipment, and to restore their own dealers' inventories. The government, however, will still have large bills to settle and will need to sell as many bonds as it can for some months after the end of hostilities. During this period, the demand for most types of goods is likely to exceed the immediate productive capacity of industry. Hence, the sale of bonds by the government will make for economic stability.

The huge expenses, including interest on the debt, which the government must meet after the war, require that the tax system be drastically reformed. Today, taxes fall most heavily upon those incomes which are the reward for increasing production and employment, because profits are taxed first as corporate profits, and taxed again as dividends to owners of the corporation. Surtaxes are so stiff and offsets for losses so meager that the well-to-do capitalists cannot afford to encourage and help promising young businessmen to start new enterprises.

A nation whose expenses are as large as those of the United States will be after the war must be sure that its tax system provides incentives, not penalties, for increasing production and employment.

Should the debt be repaid? Some people fear that any reduction of the debt would have a deflationary effect and cause unemployment. An opposite view was expressed by Mr. Morgenthau recently: "We have a big public debt that must be paid off, and the quicker we do that the better." Both of these views are extreme. Repayment of part of the debt during a period of depression would increase unemployment. Every period of high prosperity, however, would give the government an opportunity to pay off part of the debt without limiting employment. During these periods of prosperity, business corporations will sell government bonds in order to buy equipment; and many individuals will redeem war savings bonds in order to purchase houses, automobiles, and other goods. If the government budget runs a surplus during periods of high prosperity, and if this surplus is used to retire some of the bonds sold by corporations or redeemed by individuals, the country will be protected against a disorderly and speculative rise in prices. Thus, reduction of the debt can be made a device for stabilizing our economy.

There are two other reasons why reduction of the debt will be desirable.

In the first place, it will help prepare the country financially for a possible third World War. Determined as we are that this war shall be the last one, common sense tells us not to count on this. At any rate, we must be prepared for any eventuality.

In the second place, gradual reduction of the debt would stimulate employment by creating the expectation of lower taxes. It is not generally appreciated how much the willingness of individuals and business concerns to spend money is affected by the prospects of higher or lower taxes. One of the best ways to make individuals and enterprises spend more freely is to convince them that taxes will become a little lower, year by year.

Many people have difficulty in visualizing the day when there will be a substantial reduction in the burden of the national debt. And yet, if the country pursues wise economic policies, there is no reason why the debt burden should not be cut in half during the next generation.

The days of technological progress and economic expansion are not over. They are, in fact, only well begun. During the Twenties, the national income in dollars of constant purchasing power increased by well over 50 per cent. Between 1929 and 1939, it increased by less than 6 per cent. Perhaps the rate of the Twenties cannot be maintained indefinitely; but scientific research and development work in industry are laying the foundation for very large advances in national income. Suppose that the national income increases 33 per cent in the first decade after fighting stops (say, hopefully, 1945), 25 per cent in the next decade, and thereafter at the rate of 20 per cent a decade. In 1955, the national income (at present prices) would be about $173 billion; in 1965, about $216 billion; and in 1975, about $257 billion. By 1970, the burden of the debt would be reduced by nearly half, even if not a cent of it were repaid!

A huge public debt is a test of the character, the common sense, the foresight, and the equally important technical and engineering skill of a nation. ***It requires that tens of millions of small income earners be willing to become substantial holders of the debt. It requires that the nation be willing to tax itself heavily, but in ways which increase the attractiveness of job-giving or self-employment relative to job-holding; it requires that the nation be willing to pursue policies of expansion and to put a rising income for the nation ahead of the pleas of self-seeking groups in labor, agriculture, and industry.***

A huge debt may so draw out the hidden powers of a people that it makes the nation wealthier rather than poorer, stronger rather than weaker.

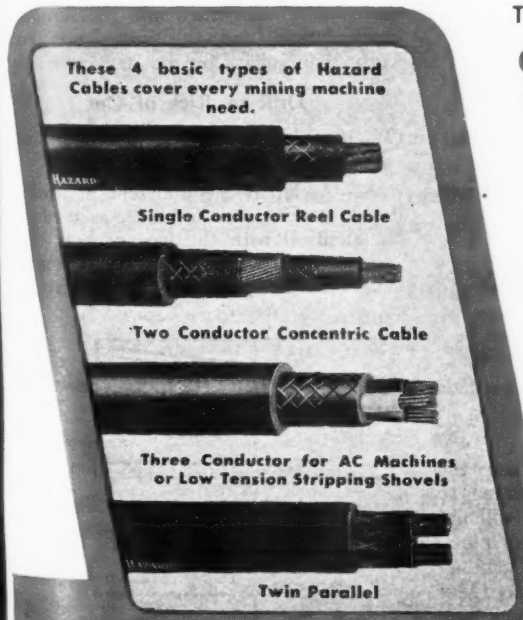
Up to now, Americans have not met the test of a big public debt too well. Individuals have saved more in cash than in government bonds, and the country has shown little interest in avoiding the kind of taxes that reduce the demand for labor. These shortcomings, I am sure, stem largely from the fact that the American people never have had the problems of debt and taxation honestly and adequately explained to them.

I have confidence in the American people. I believe that Americans have the intelligence to understand this problem of the public debt, the character to face their responsibility regarding it, and the common sense to accept the challenge and make the most of it.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

HAZACORD Cables provide perfect protection against the ragged edges of coal and rock that ordinarily play havoc with mining machine cables. Hazard has built a line of cables tough, strong and flexible that ably withstand this punishment and give long service at a minimum of cost.


These 4 basic types of Hazard Cables cover every mining machine need.
HAZARD
Single Conductor Reel Cable
Two Conductor Concentric Cable
Three Conductor for AC Machines or Low Tension Stripping Shovels
Twin Parallel

These **3 EXTRAS** go into every Hazard Mining Cable:

1. **FLEXIBILITY** . . . Quantities of fine, rope-stranded copper wire make these cables limp and non-kinking.

2. **STRONG INSULATION** . . . Synthetic rubber of high dielectric strength has excellent tensile strength and long aging characteristics.

3. **TOUGH, RESILIENT, TEAR-RESISTANT JACKET** . . . Scientifically processed synthetic rubber, vulcanized in a continuous metal mold, makes a smooth, strong jacket that can be pulled around rough walls and corners with the least abrasion and thus the lowest cost.

HAZARD INSULATED WIRE WORKS
Division of The Okonite Company
WILKES-BARRE, PA.
Offices in principal cities

ARMY E NAVY

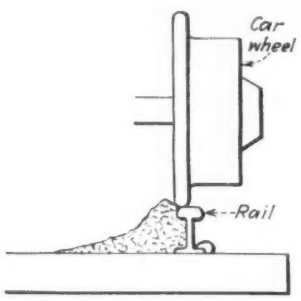
HAZARD Electrical Cables for Every Mining Use

STATE-BOARD QUESTIONS

Coal Age Quiz

Q.—Why should pushing of cars by locomotives be reduced to a minimum?

A.—Because, should the wheels and bumpers bind at some irregularity in alignment or level, the car may leave the track. Also, some obstacle on the rail or track or a pile of loose coal may lift one of the car wheels so much that its flange will be higher than the rail, and then there will be nothing to hold in place the wheel thus lifted, and the car will be derailed (see sketch). Elevation of the outer rail on curves will aid in preventing derailments, especially where cars are traveling at speed, but cars never should be pushed faster than at a brisk walk. A car being pulled



Wheel rises on dirt or a lump of coal and car leaves track.

tends to rerail itself. A car being pushed does just the reverse; the more it is pushed, the farther it tends to leave the track. If you conclude that you must push cars occasionally for a short distance, be sure the alignment of the track is perfect and the track is clean, but just in such places is the track usually dirtiest from the jolting of cars and the upsetting of coal and rock thus caused. Hernias (ruptures) resulting from strain in the rerailing of mine cars are an important item in compensation and, for that important reason among others, derailments should be avoided. Rerailing delays also upset cutting and loading schedules.

Where Water Gage Fails

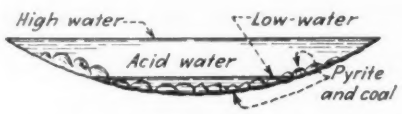
Q.—In a mine where the air returns, in the usual way, through a back heading parallel to the intake but is traveling in the opposite direction to the incoming air, where is the water gage least?

A.—The water gage is least in the most advanced headings, because at the end of the main entries the intake and return airways are joined by an open crosscut, so there is very little difference in pressure between them at that point and little at any point near it. Difference of pressure between intake and return is greatest near the fan.

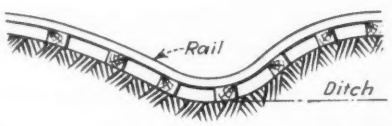
Preventing Corrosion

Q.—What will reduce pump corrosion in coal mines?

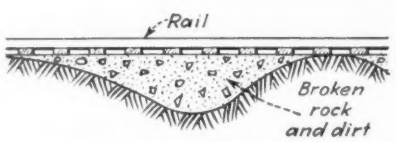
A.—(1) Prompt removal of water from all parts of the mine. When the surface of the water at any point lowers, the pyrites ("sulphur balls") are exposed to the air and are soon converted on their surfaces to whitish dust which dissolves in water as soon as the water level again is allowed to rise so as to reach the dust (see sketch). When this powder is dissolved by the



Pyrite is alternately oxidized by being uncovered and then dissolved by rising water.



Ditch it so that it will be dry at all times.



Or fill it with rock and let water overflow.

water, the latter becomes acid. If you must have some standing pools, keep the water in them shallow and confined to a small area, and the water then will not become acid and corrode pumps or pipes.

Better yet, don't tolerate any standing pools in the headings; either drain them (see sketch) or fill them with rock (see sketch), or carry the water in pipes past all low places so that they won't have to be pumped or bailed. If they are filled with rock, the excess water in them will run away and as the water in them will never raise or lower its level or spread over the surrounding floor, it will associate only with pyrite that is never exposed to air and so does not form acid (see sketch). It is the rising and falling of water that makes all the trouble from corrosion. Keep the water level always at one height, and the water in the pool will not get acid.

Remember always this aphorism: Lower the water level and the wet pyrite in the ground becomes acid; raise the water level and the water dissolves the acid in the ground and thereafter is acid; keep the water level constant and nothing happens, except that sulphur bacteria get busy and get their oxygen from the acid sulphates, converting them slowly to sulphides which, being solids, fall and cover the swag bottom. These sulphides will flash back into sulphates as soon as a pump or a ditch dries out the swag. A "swag," according to "A Glossary of Mining Terms," Coal Miners' Pocketbook, is: "A depression in a roadway usually containing water." Compare "swale."

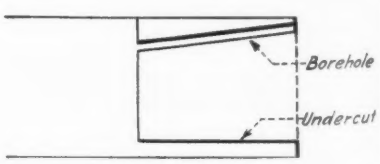
(2) Use pumps made of non-corrodible material.

(3) Do not turn steam into sumps; they will convert sulphates of iron into sulphates of hydrogen (sulphuric acid), and the acidity will be greatly increased. When steam pumps were still being used, the exhaust was turned into the sump for condensation, and the water was even worse than today, and no one knew why.

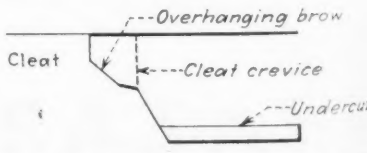
Drill to Back of Cut

Q.—How far should drillholes extend into coal at face of room or heading?

A.—As far as the undercut or overcut, if the working face is made, as it should be, identical with the face or butt cleats (see first sketch). Beware of overhanging "coal brows," especially where the working



Borehole should be as long as undercut is deep.



Overhanging brow, breaking loose at cleat crevice, will fall on kerf cutter.

MORE THAN EVER YOU NEED Securityflex

...the Twin Parallel cable with these exclusive construction advantages

This cross-section shows Anaconda's twin parallel Securityflex cable with self-contained ground wire. This special cable has only slightly increased diameter, so that usual lengths may be handled on standard conductor reels. It offers a simple, convenient method for grounding loaders, conveyors, cutters, etc.

for example...

1. *Special D-shaped insulation* developed by Anaconda cable engineers. Prevents twisting. Impossible for one conductor to ride over the other and cause failures.

2. *Time-saving Breaker Strip* to separate the two conductors. Connections and splices can be made with greatest speed and ease. Also aids in preventing short circuits if run over by mine equipment.

3. Maximum flexibility . . . thanks to Anaconda Herringbone compensating construction.

4. Rugged Seine Twine reinforcement webbing for greater strength and to prevent tearing of jacket.

5. With all rubber covered cable war restricted *Securityflex construction features are more important than ever.* 41247

ANACONDA WIRE & CABLE COMPANY
Subsidiary of Anaconda Copper Mining Company
General Offices: 25 Broadway, New York 4
Chicago Office: 20 North Wacker Drive 6
Sales Offices in Principal Cities

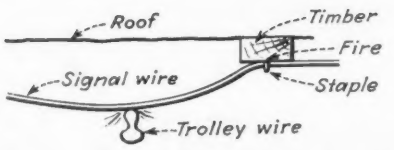
ANACONDA

Anaconda Wire & Cable Co.

face is advancing at right angles to the face cleavage (see second sketch). This face cleat is a continuous line of fracture usually extending along the full width of the room and often much farther. The brows thus are not firmly attached to the coal mass and may pitch forward at any time.

Q.—A dead wire is one that is not carrying electricity. Is such a wire or a low-voltage wire safe?

A.—Not always, for it may fall on a live higher-voltage conductor such as a trolley wire and become charged with electricity and thus be a "booby trap," shocking someone seriously unawares or setting fire to timber or coal, for a dead wire which falls on a live wire, or on which a live wire falls, gets a voltage almost that of the live wire, and so can give almost as severe a shock. Also, a signal wire with a low voltage may give a vicious shock or do immense damage if it should fall on a trolley wire or a trolley wire fall upon it (see sketch).



Bad practice—Harmless (?) signal wire sags until it touches trolley wire and sets fire to timber.

Mine Foremen, West Virginia*

Q.—Why is it not advisable to fight a mine fire by flooding? (1942, Fires and Explosions, p. 124—continued.

A.—Considerations (a) (b) (c) and (d) were discussed, *Coal Age*, June, p. 108, and July, p. 92. Consideration (e): "Possibility of generating explosive and dangerous gases by insufficient quantity of water in fire area" remains to be studied.

Dangerous Gases

[(e) Hydrogen and carbon monoxide are likely to be formed where water is put on a fire in a volume insufficient to quench it. Lower explosive limits of mixtures of hydrogen, carbon monoxide and methane, each by each, with air are 4.1, 12.5 and 5.0 respectively. Therefore hydrogen is the big offender, and it is more dangerous when it is cornered and cannot escape than when it is free to travel away to the return, as it can in direct application of water by hose or by soda-acid equipment.

[Many other uncertainties are introduced by high pressures. These pressures may increase adsorption of oxygen (which is the piling of oxygen on the surface of the coal) and thus deplete the oxygen in the air and decrease the hazard of explosion. Or again, the oxygen thus adsorbed may be made more active by such adsorption and more capable of starting combustion. Again the heat of the fire may cause the activation of the carbon in the coal and increase the readiness with which oxygen is adsorbed. There are a number of what are probably unknown or unweighted factors.

Coal gas is said, in Kingzett's Chemical Encyclopedia, 6th Edition, p. 422, to contain: hydrogen, 48.2 percent; methane, 34.2; carbon monoxide, 6.6; olefines and benzene, 5.3; and nitrogen, carbon dioxide and oxygen, 57 percent = 100.00. Three of the olefines are gases at normal temperatures; these are ethylene (ethene or olefiant gas are other names for the same gas), propylene and butylene; the rest normally are liquids. As these olefines, with benzene, toluene and xylene of the benzene group, explode at lower concentrations than methane or hydrogen, they lower the concentration at which the mixture will explode. The boiling points and explosive limits of some of the gases which may be found in a fire area are included in the accompanying table. Figures were taken from *U. S. Bureau of Mines Bulletin*, 279. Methane it will be seen is far from being the most dangerous gas. It is slow to ignite but the large volume of its emission and its emission without application of heat more than make up for its high lower limit and its tardy ignition.

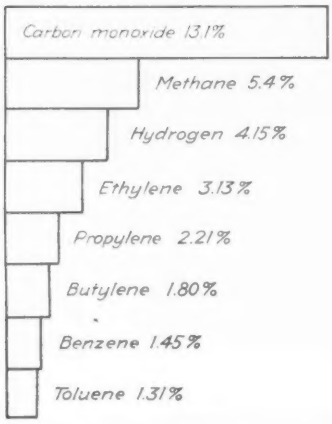
It must be remembered that it will be a long time before the rising water reaches the fire, if indeed it ever does. In the meantime, it will be not water gas but coal and other carbonization gases which will be formed as soon as the water used in fighting the mine fire directly, has been drained away or evaporated. The heat of the fire decomposes the pillar facing the burning pillar, depriving it of its volatile matter. This is mostly methane, water and carbon dioxide, though many other gases may be formed and emitted. Low-temperature carbonization and high-temperature carbonization also may occur.

[(f) Risk of flooding adjacent mines and cost of placing dams against such flooding. In some cases, there are insufficient pillars to permit of such damming with safety.]

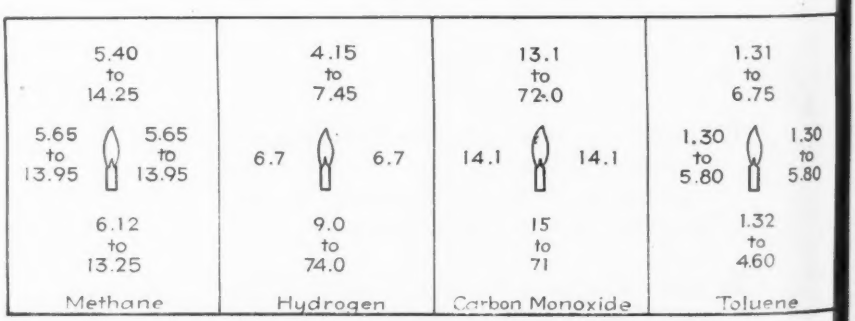
Virtues of Flooding

[After all, flooding has its virtues. It seals more tightly than any other form of closure. Of all other forms of sealing there may be doubt, but with flooding there is no uncertainty. The water may not reach the fire and flooding may not put out the fire, but the fire goes out because the flooding seals the approaches and that is the answer.]

* Continued from July *Coal Age*, p. 92.



Lower limits for upward flame propagation.



Ranges of flame propagation, upward, sidewise and downward.

BOILING POINTS AND EXPLOSIVE LIMITS OF GASES LIKELY TO BE FOUND IN A COAL-MINE FIRE AREA

Gas Burned in Air	Boiling Point, Deg. F.	Limits of Propagation of Flame— Upward	Sidewise	Downward
Methane* (CH_4)		5.40 and 14.25	5.65 and 13.95	6.12 and 13.25
Hydrogen* (H_2)		4.15 and 7.45	6.7	9.0 and 74.0
Carbon Monoxide (CO)		13.1† and 72.0†	14.1†	15 and 71
Ethylene* (C_2H_4)	−155.2	3.13 and 33.3	3.25 and 22.4	3.42 and 15.3
Propylene* (C_3H_6)	−52.6	2.21 and 9.6	2.26 and 8.4	2.29 and 7.3
Butylene* (C_4H_8)	−23.0	1.80 and 9.0	1.82 and 7.4	1.84 and 6.10
Amylene (C_5H_{10})				1.6
Benzene§ (C_6H_6)	+176.5	1.45 and 7.45‡	1.46 and 6.65‡	1.43 and 5.55
Toluene§ ($C_6H_5.CH_3$)	+231.2	1.31 and 6.75‡	1.30 and 5.80‡	1.32 and 4.60

* Half saturated with water vapor. † Saturated and in a closed 2-in. tube (5.08 cm.). § Dry
‡ At 140 deg. F. Unless otherwise stated, these observations were made by introducing flames into glass tubes containing air and gas in the percentages noted, these tubes being of 5 cm. (1.97 in.) diameter and 150 cm. (4 ft. 11.06 in.) long. Firing end of tube is closed in every instance.

Improved LUBRICATION

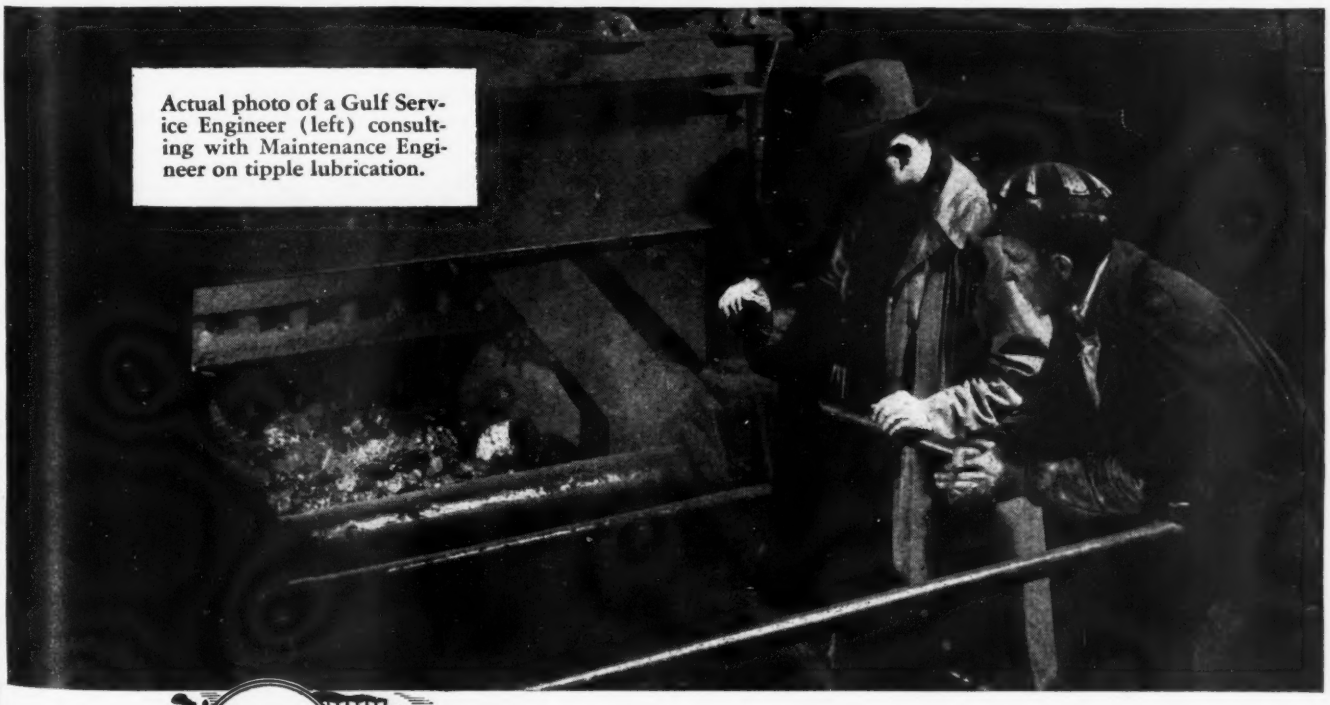
IS SAFER LUBRICATION

Let a Gulf Service Engineer help you reduce wear and eliminate unnecessary hazards.

Many vital points in modern coal preparation plants present difficult lubrication problems because of their inaccessibility during operating hours. As a result, lubrication is often neglected, to avoid taking chances on possible injury to employees.

Gulf Service Engineers are schooled in scientific methods of applying lubricants to eliminate unnecessary hazards, and their recommendations have led to improved safety records and better lubrication in many preparation plants.

The scientific lubrication prescribed by Gulf Service Engineers pays dividends in every phase of mine operation. It contributes to lower maintenance and power costs, reduced fire hazard, fewer delays caused by mechanical troubles, and greater tonnage. Call in a Gulf Service Engineer today and let him help you on your lubrication and maintenance problems. Write, wire, or phone your nearest Gulf office.



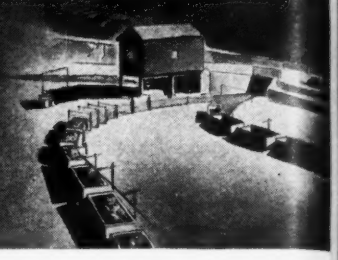
Actual photo of a Gulf Service Engineer (left) consulting with Maintenance Engineer on tipple lubrication.

GULF INDUSTRIAL LUBRICATION

GULF OIL CORPORATION · GULF REFINING COMPANY

GULF BUILDING, PITTSBURGH 30, PA.

TIMELY OPERATING IDEAS



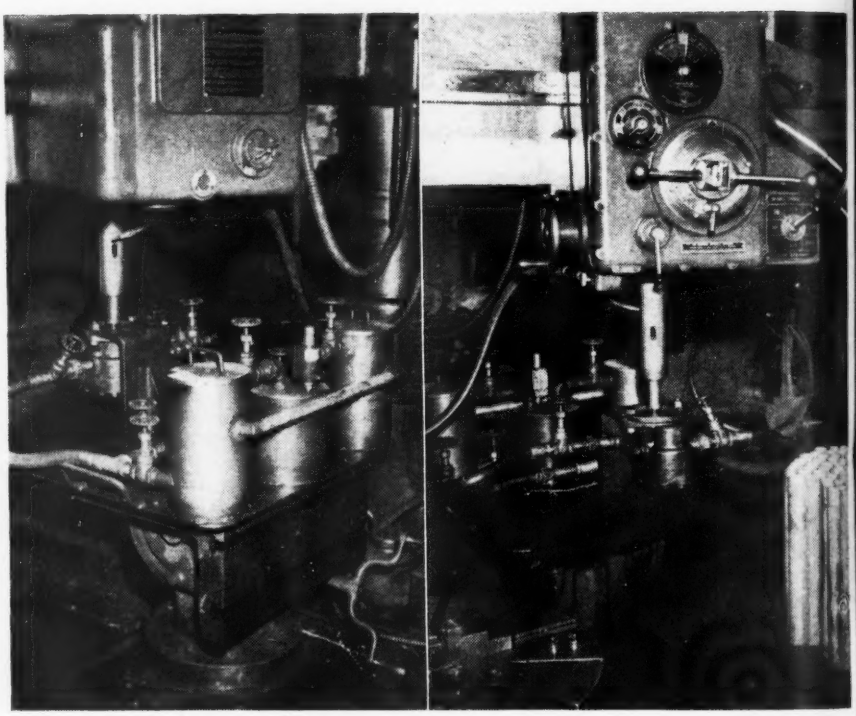
Drill Press Powers Pump Tester

WITH WARTIME CONDITIONS making usual handling difficult, hydraulic pumps for Joy loading machines and Jeffrey track cutters are rehoned with a miller, tested and returned to service at the Superior-D. O. Clark operation of the Union Pacific Coal Co., Superior, Wyo.

Testing of pumps is done with a drill press and a special test kit. This test kit, designed to be mounted on the drill press L-table by capscrews fitting in the slots, consists of two supply tanks, a pressure tank with Schrader gage (300 to 1,800 lb. per square inch), a bracket into which the pump to be tested is bolted and the necessary hoses, tubing, valves and fittings.

When a pump is to be tested, it is bolted into the bracket and the necessary connections are made. The drill-press spindle is swung over and lowered to driving position, after which testing proceeds. Pumps are tested at as near the speeds they normally operate as is possible.

The test kit was developed by Mart Hansen, chief electrician, and Roy Hiner, master mechanic. It also is used to test pumps for the Nordberg hoists.

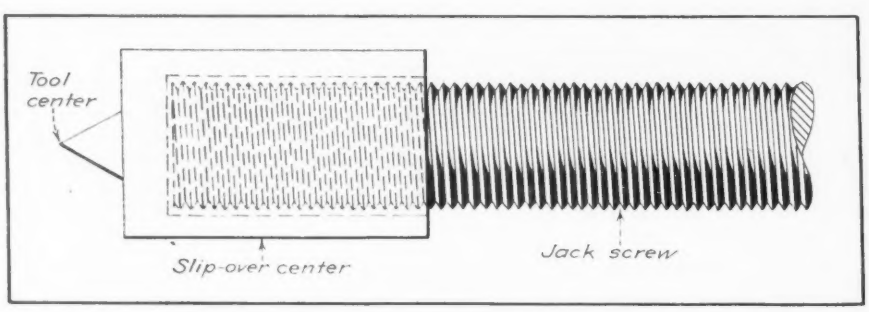


Two views of the pump tester set up for operation by the drill press.

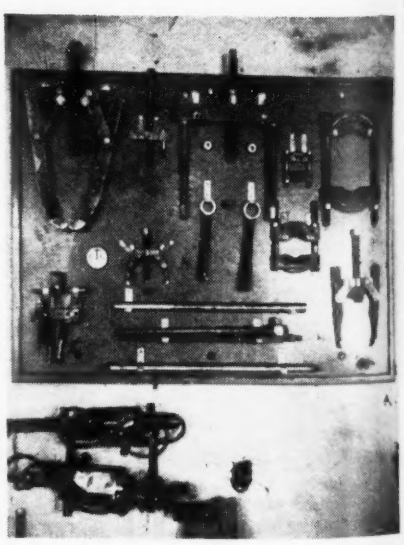
Special Tool Kit Handles Pulling Jobs

TWO OF THE MOST troublesome jobs the maintenance man encounters are removing pinions and bearings from motor shafts quickly and without damage to the parts. The Sahara Coal Co., Harrisburg, Ill., has found the answer to most of the problems in special tools supplied by the Owotonna Tool Co., Owotonna, Minn.

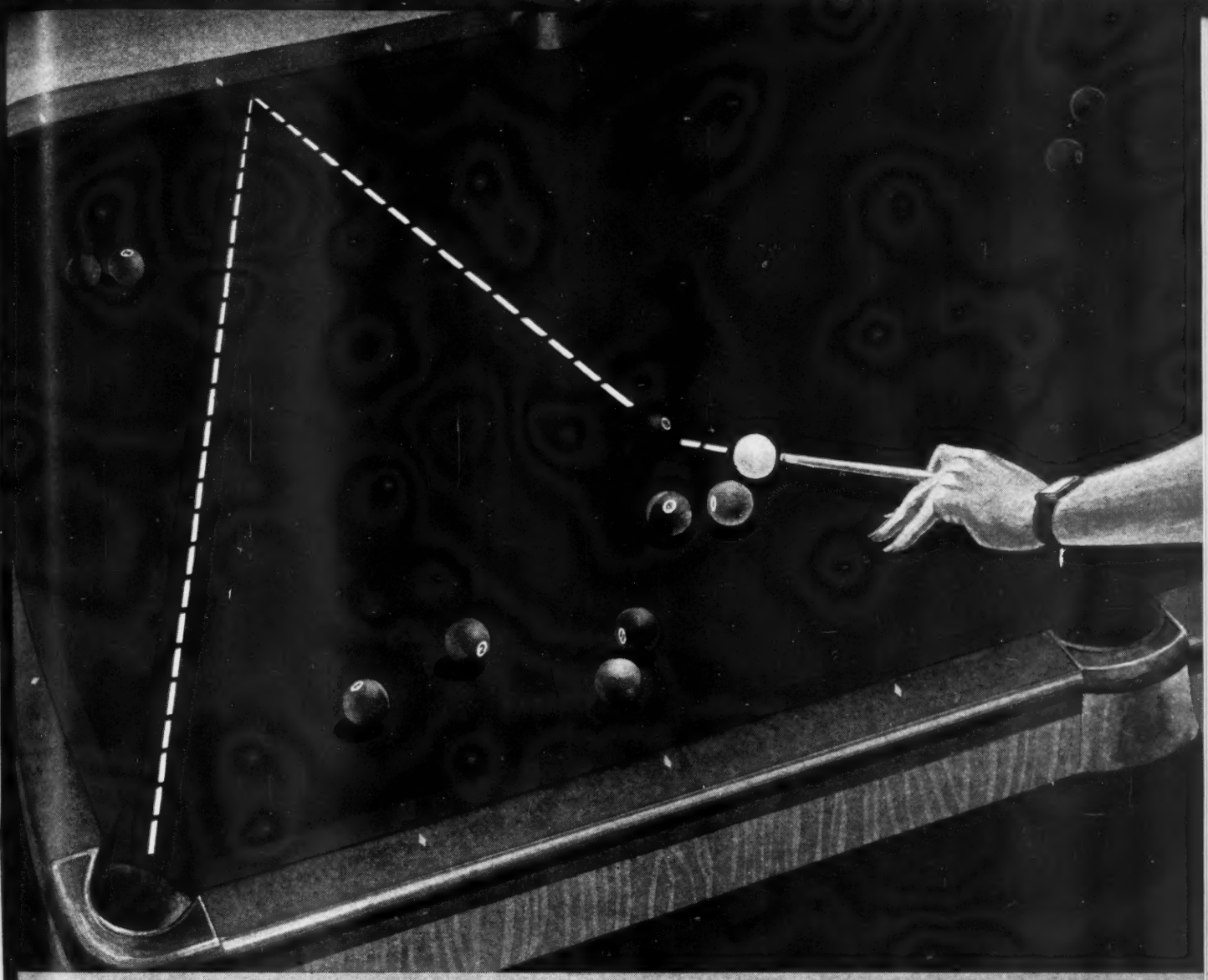
Sahara has arranged the whole set on a convenient wall panel where all the tools and accessories may be seen at a glance and the necessary selection made without loss of time. Pulling tools have been improved by making a case-hardened slip-over center to protect the end of the jack-screw and hold it in place.



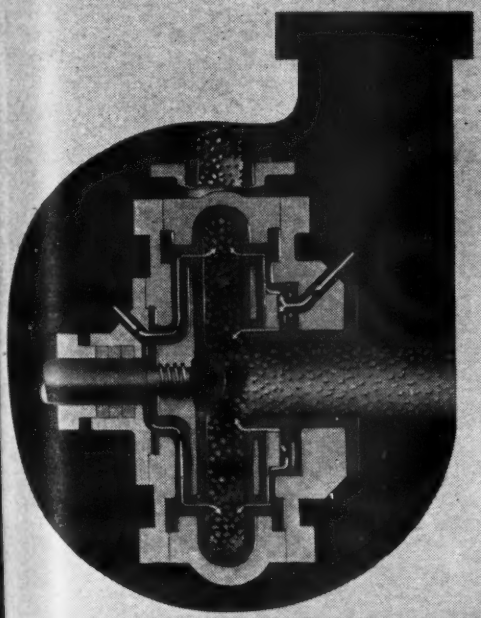
Slip-over center protects end of jack screws and holds tool in line.



Handy for use—panel with tools for pinion and bearing pulling.



The "POOL CUSHION PRINCIPLE" *for Abrasives Pumping*



Maximix Rubber Parts in Hydroseal Pumps have the same effect on abrasive materials being pumped as the cushions of a pool table have on balls which strike it, i.e., THEY BOUNCE OFF. That's why Maximix Rubber lasts many times longer than equivalent metal parts. . . . Diagram at left shows a section thru a Hydroseal Sand Pump, with Maximix Rubber Parts indicated in green. Note that the abrasives pumped do not come in contact with metal. The hydrosealing flow of clear water is indicated by arrows in this diagram. Hydrosealing prevents abrasives-laden water from entering the clearance between the impeller and pump side plates. This further reduces maintenance and, in addition, it develops and maintains high pumping efficiencies. . . . Maximix Rubber Parts of Hydroseal Pumps are easily replaced when they finally wear out. . . . Our Catalog No. 140 tells all about "Maximix" and "Hydrosealing". Write for it.

HYDROSEAL **ABRASIVES AND CORROSIVES MATERIALS HANDLING PUMP**

THE ALLEN-SHERMAN-HOFF CO., 231 S. 15th Street, Philadelphia 2, Pa.

Offices or Representatives in most Principal Cities

Detergent Facilitates Cleaning Rags

WHERE WIPING RAGS are used instead of cotton waste, efforts to clean them sometimes have failed because the saturated oily rags were too tough a job for the usual soap powders.

The answer to the problem at the Saxton mine, Terre Haute, Ind., was found in a compound known as duPont "Detergent No. 2," which is bought in barrel lots and used in an ordinary household washer. "Detergent" means "cleansing, purging," according to Webster. Oily rags come out of the wash as clean as new.

This washing machine and a special detergent are the answer to clean wiping rags in the Saxton power house.

Locked Up!

Don't keep those ideas locked up at your mine. Others would use them and gladly give you the credit—if you would only tell. Better break down and send them in and let Coal Age send them on. For each mechanical, electrical, operating or safety idea that's acceptable, Coal Age will pay $5 or more on publication. Include a sketch or photograph.

Banding Restores Worn Hoist Drums

BUILDING UP worn hoist drums used in coal unloading at the Duluth (Minn.) docks of the Berwind Fuel Co. by welding on rolled-steel strips is reported to have resulted in savings of $1,850 per drum. Cost of the welded repairs is given as about $150, including 100 percent overhead cost for machining, as compared to an outlay of approximately $2,000 for a new drum.

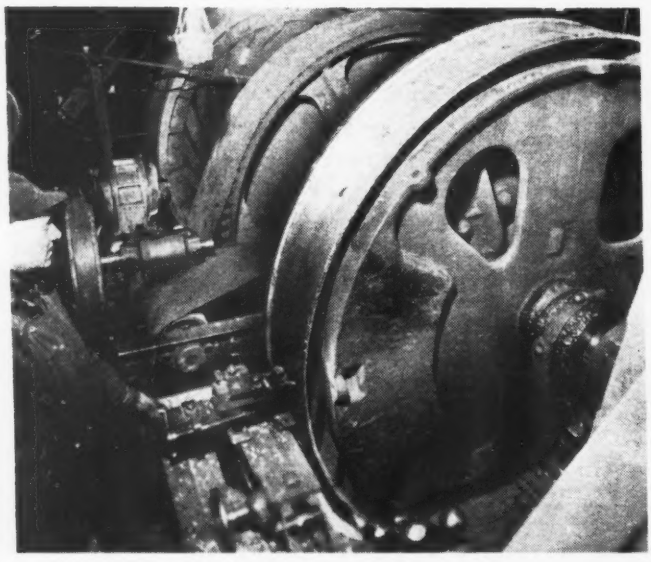
Cast steel was employed in the original hoisting drums, 8 ft. in diameter with faces 11½ in. wide. An improvised lathe set-up (Fig. 1) is used to reface the drums and thus eliminate chatter and faulty operation of the unloading equipment which they control.

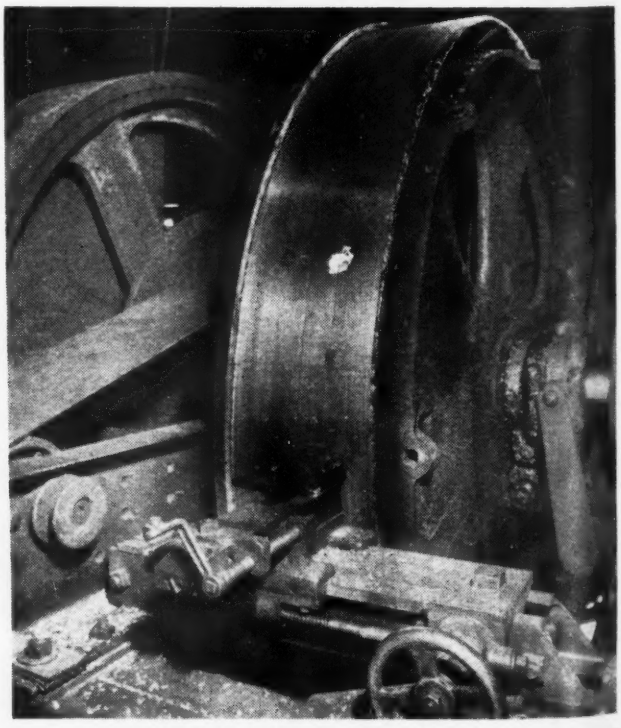
When new drums became difficult to obtain, arc-welding methods were called upon to keep the old ones in service. The old drums, when they had been refaced to a point where additional cutting was impossible, were resurfaced by applying shaped 2-ft. lengths of rolled steel to provide a new wearing surface. The 2-ft. lengths not only simplify handling but provide more welding area and thus assure a solid connection between the old material and the new.

Holes also are burned into the new plates for plug welds as shown in Fig. 2. These, together with the normal contraction of the welds, proved very desirable in that a tight fit is obtained without mechanical assistance. The welding procedure consisted of first fusing the plate lengths at the ends and then welding around the rims of the drums. The electrode was $\frac{5}{32}$ in. in diameter, shielded-arc type, American Welding Society Specification E-6010. Machining with the lathe set-up and steady rest to restore proper dimensions followed welding.

Entire time to completely weld one drum aggregated only 12 hours, it is reported, whereas the bulk of the time for the complete job included 54 hours set-up time, 36 hours' machining and 6 hours to remove equipment.

Fig. 1 (below)—Machining hoist drum with improvised lathe set-up after welding on new rolled-steel plate lengths to restore surface. Fig. 2 (right)—Close-up of weld-restored drum, showing butt and plug welds.

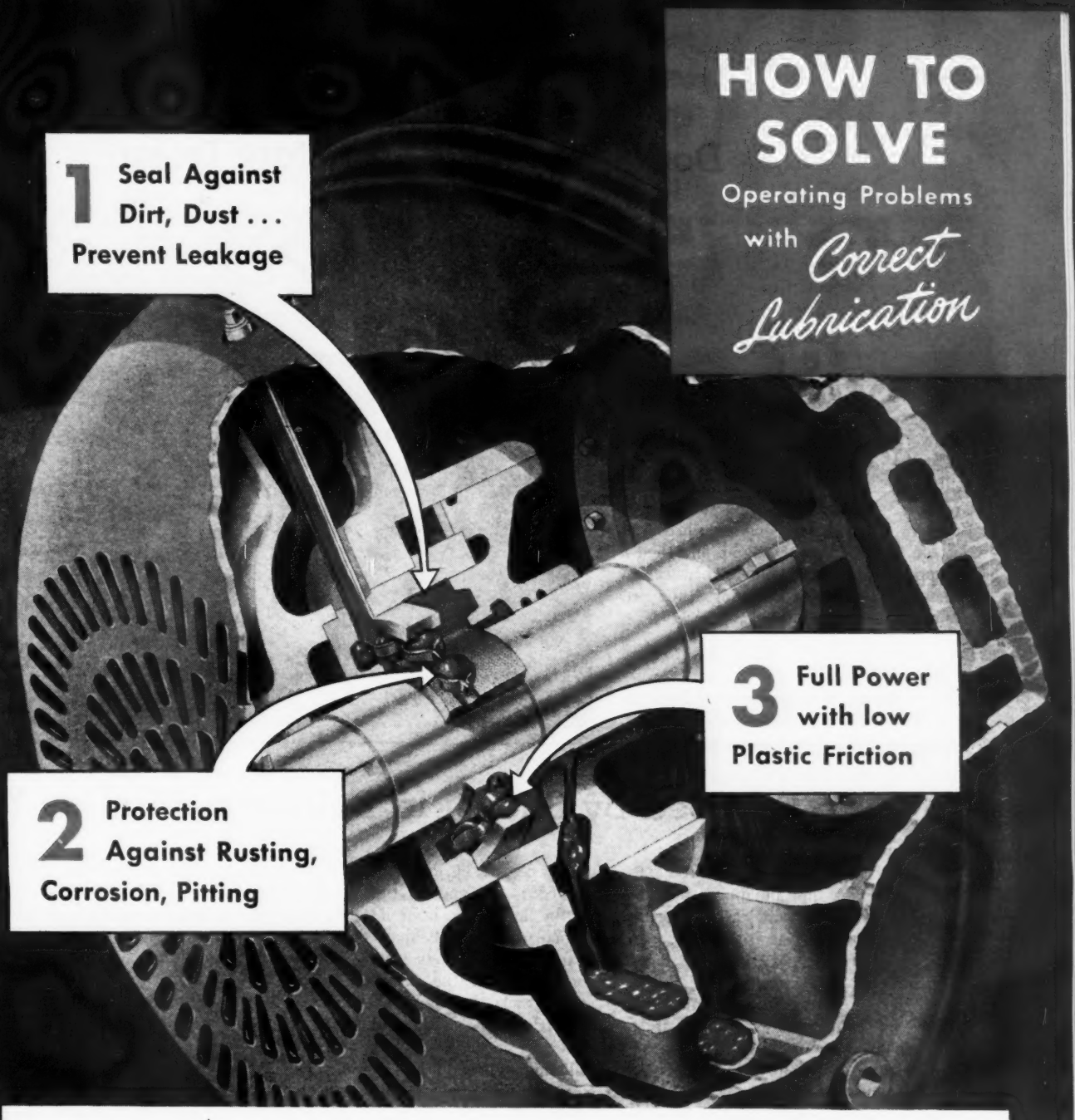




ONE OF A SERIES OF SUGGESTIONS TO AID PRODUCTION

HOW TO SOLVE

Operating Problems with *Correct Lubrication*


1 Seal Against Dirt, Dust . . . Prevent Leakage
2 Protection Against Rusting, Corrosion, Pitting
3 Full Power with low Plastic Friction

3 "Musts" for Ball Bearings

YOU'LL FIND that Gargoyle Greases BRB combine all the vital factors needed for efficient ball-bearing operation.

These greases are stiff enough to seal out impurities and keep leakage down to a minimum—make frequent repackings unnecessary.

At the same time, they are designed to provide low plastic friction which means low power consumption. Their protective films guard against rust, corrosion and pitting of balls and races, and their stable structure resists oxidation and separation.

Ask your Socony-Vacuum representative for the Correct Gargoyle Grease BRB for your particular ball-bearing application.

GARGOYLE Lubricants

SOCONY-VACUUM OIL CO., INC., Standard Oil of N. Y. Div. • White Star Div. • Lubrite Div. • Chicago Div. • White Eagle Div. • Wadhams Div. • Magnolia Petroleum Company • General Petroleum Corporation of California.

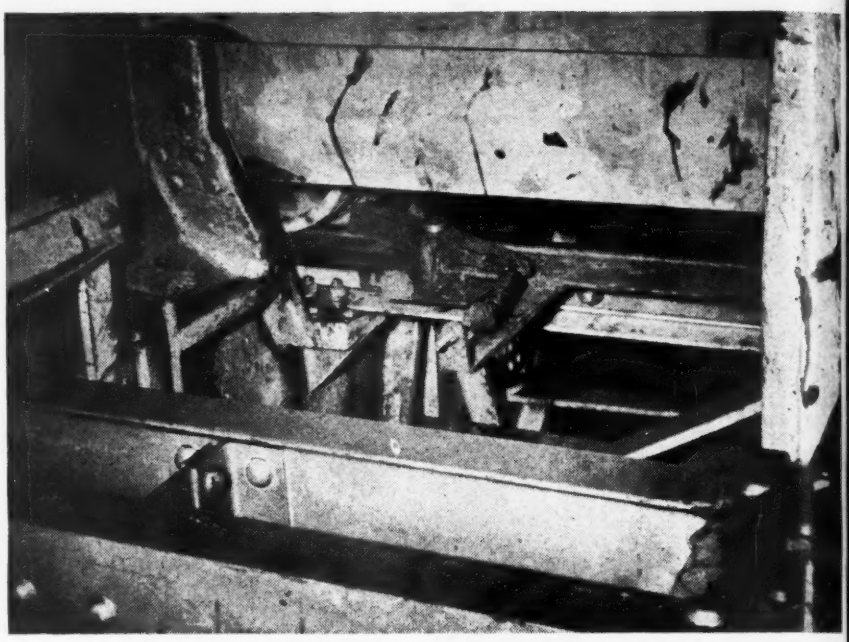
CALL IN SOCONY-VACUUM

ONE OF A SERIES OF SUGGESTIONS TO AID PRODUCTION

Dog Keeps Cars in Rotary Dump

MINE CARS at the new Stansbury mine of the Union Pacific Coal Co., Stansbury, Wyo., are emptied by a single-car rotary dump after being uncoupled. In the early stages of operation, it was found that occasionally cars would strike the dogs and rebound enough to cause trouble in dump operation. The condition was remedied by installing an auxiliary spring-equipped dog behind one rear wheel.

Dog and spring, with a stop to prevent the dog from going more than the desired distance across the top of the rail, are mounted on brackets welded to the track rail. In operation, the dog is pushed aside as the car runs into the dump and then is snapped back behind the rear wheel by the action of the coil spring, thus preventing the car from bouncing back.



Spring dog keeps cars from rebounding and fouling the dump.

Slate Dumped by Shovel in Building Wireless Yard

FOR DUMPING SLATE parallel to the track and at the same time building a fill for a timber and material yard, an old Bucyrus-Erie steam shovel of small size and mounted on crawlers is considered highly satisfactory at a large mine in the Pocahontas field. Another arrangement which at the same mine makes it unnecessary to have trolley wires in the yard or on the slate track is a feature which works to excellent advantage with the shovel.

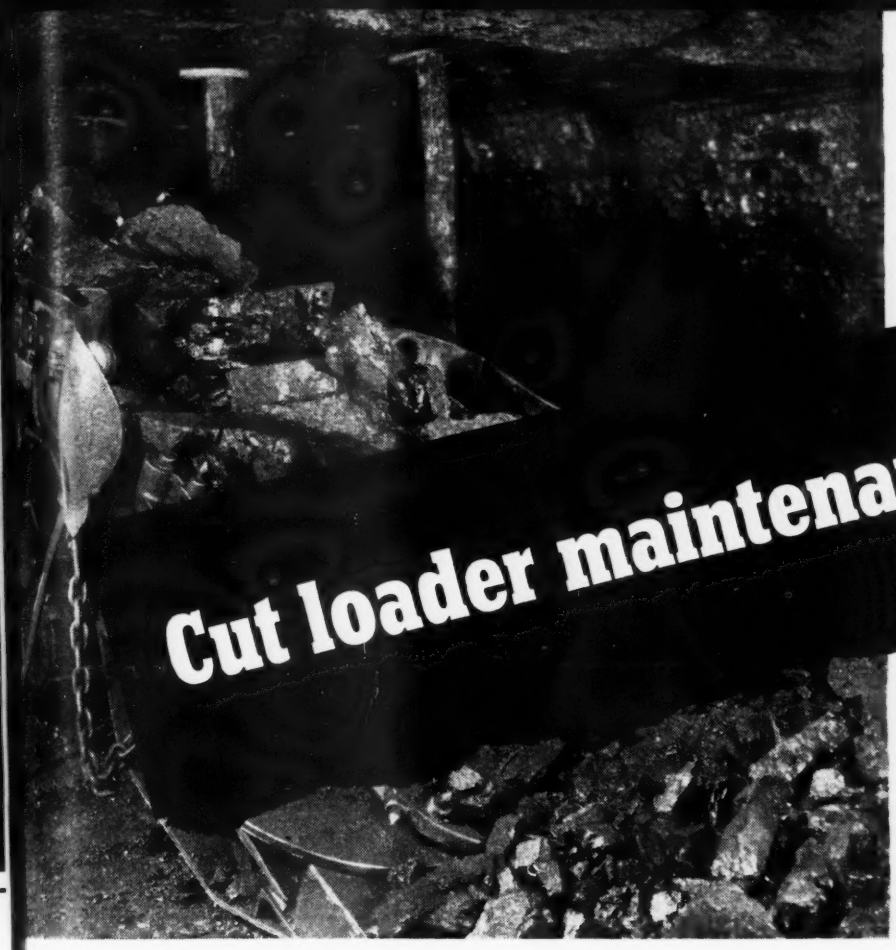
Tracks entering and extending into the yard are on 1-percent downgrade from the switches that connect them with the main tracks. Trips of loaded slate cars or of empty cars to be loaded with timber are coasted in by gravity, then pulled back out by an electric hoist installed for that particular purpose. Absence of trolley wires is an important safety feature and a great convenience in the maneuvering of the motor trucks that bring in timber. A pair of vertical rope-guiding rollers on a concrete pier at the head of the yard and installation of the hoist a considerable distance from the pier promote satisfactory spooling.

Use of a crawler shovel for dumping slate means that the trip of cars need not be moved during the dumping. The shovel moves from one car to the next. A chain from the dipper is hooked to the near side of the car, which is then raised and tipped over beyond vertical by manipulation of the dipper.

The two-man crew has dumped 100 cars of slate in 8 hours. The shovel is used to slide the track over to the edge of the fill and to level the ground. Its movements roll the surface to a smoothness desirable in the yard. As might be expected, the shovel is utilized often for other purposes such as unloading materials and miscellaneous dirt-moving jobs around the property.

Trip remains stationary and shovel travels along to dump each car.

Hoist which pulls trips out from slate dumping and timber-yard tracks, thus obviating any necessity for trolley wires on those tracks.



Cut loader maintenance with...

...lubrication fitted to age and condition of equipment

What lubricant to use? How much? How often? Answers to these questions may help cut your loader maintenance. Perhaps you've answered them before. But the *right* answers are not the same today as they were under prewar operation. They may not even be the same as they were when your equipment was newer.

That's where Standard Lubrication Engineering may help you—by answering these questions now—by accurately matching lubricants and methods to your present needs. Here's what this engineering service offers.

Standard Oil's Superla Mine Loader Lubricants are available in six grades. These six thickened oils will handle the wide range of operating conditions found on various makes and sizes of loaders. Each grade provides the exact lubricating qualities needed, regardless of the age or type of equipment. All are designed to minimize overheating, leakage, wear, and part replacements.

Standard Oil's Lubrication Engineers can analyze your operating conditions and recommend lubricants that are exactly fitted for them. They'll work with you in planning new and faster methods of lubrication and new lubricating schedules.

Let one of these Engineers help you bring your loader lubrication up to date. Test the Superla Mine Loader Lubricants he recommends. Just call any Standard Oil Company (Indiana) office, or write 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

Superla Mine Lubricants include:

No. 3—A dripless oil for fairly tight loader gear cases, and excellent for wick feed oilers on loaders and locomotive bearings.

No. 4—A fibrous type thickened oil particularly for Goodman Loader lubrication.

No. 5—A fibrous type thickened oil for gears and transmissions on Joy Loaders. Particularly useful in reducing consumption.

No. 6—A fibrous type thickened oil for gear cases and gathering head pots on Joy Loaders. Can be applied with pressure gun for bearings.

No. 7—A fibrous type thickened oil for general mine lubrication underground—for loaders, shuttle car motor gear cases, and conveyor bearing lubrication.

No. 8—A smooth type, heavy thickened oil for armature bearings and make-up in cases requiring a leak-proof lubricant.

INDOILS . . . Three grades of straight mineral oil for hydraulic systems.

No. 41
No. 75
No. 95
} Provide a range of viscosities to meet all loader hydraulic system requirements.

Gasoline Powers the Attack . . .
Don't Waste a Drop!

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

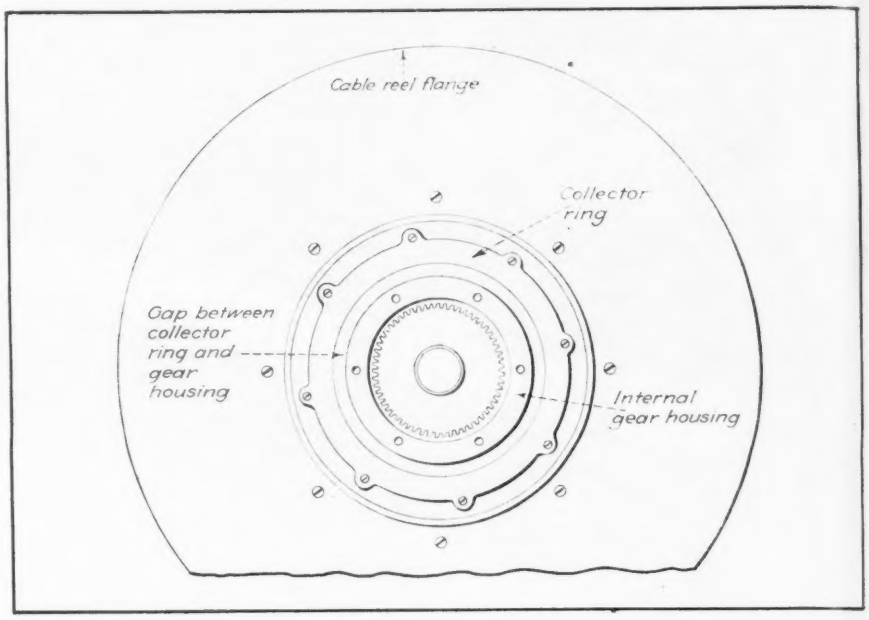
★ LUBRICATION ENGINEERING

Asbestos Ring Protects Cable Reel

IN REPLACING the center of a G.E. CY-21 locomotive cable reel, extra steps can be taken to lengthen reel life and lower maintenance costs, declares E. C. Hitchcock, night electrician, New River Co., Summerlee, W. Va.

In lining the reel center, as shown in the accompanying sketch, first apply a good coat of insulating paint. Next cut a ring of asbestos paper from $\frac{1}{8}$-in. stock and put in place. Fasten the collector ring in place with eight $\frac{1}{4}$x1$\frac{1}{2}$-in. wood screws and then the internal gear housing with six $\frac{5}{16}$x3$\frac{1}{2}$-in. flat-head bolts. Eight $\frac{3}{8}$x5-in. bolts with countersunk heads are used to bolt the reel flange. The asbestos paper lining the gap between the collector ring and the support for the internal gear housing eliminates the possibility of arc from the reel brushes forming a charcoal path across which current could travel to ground to burn up the reel.

"Using this method," states Mr. Hitchcock, "will add one-half to two-thirds to the life of the reel."



Details of reel where asbestos ring affords added protection.

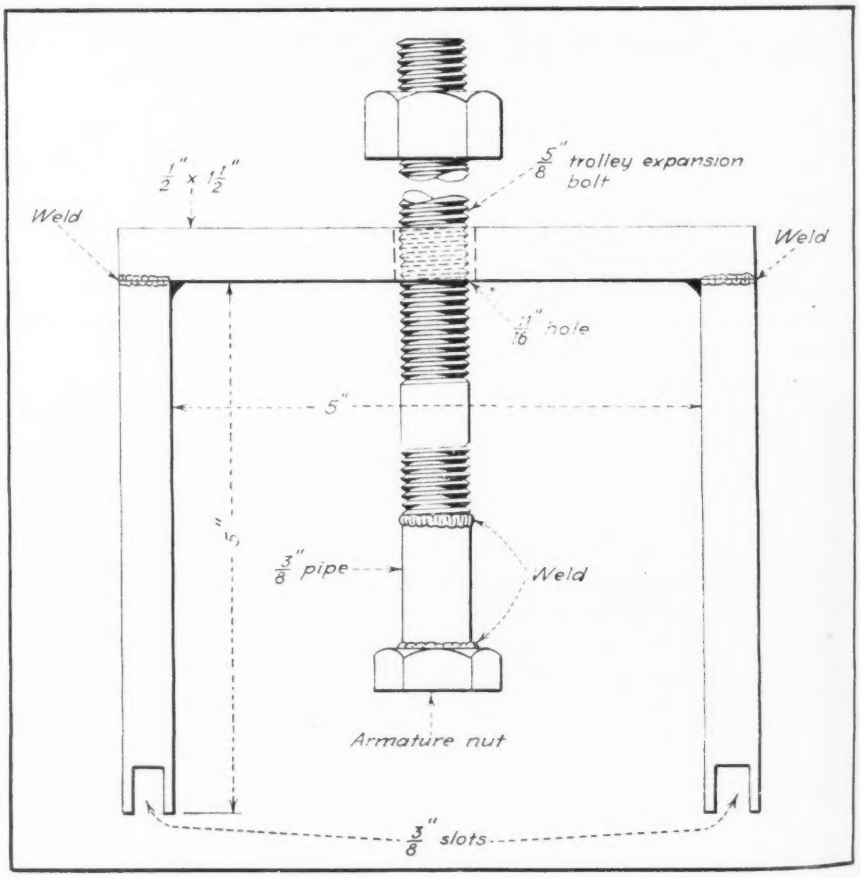
Special Puller Pulls Drill Armature

TIME REQUIRED for pulling a CP conveyor coal-drill armature has been reduced through the use of a special puller, writes E. C. Hitchcock, night electrician, New River Co., Summerlee, W. Va.

This puller, fabricated from materials easily obtainable around the mine, consists mainly of a box-shaped U-frame of strap iron with bolt assembly for doing the pulling. This bolt assembly consists of a $\frac{5}{8}$-in. trolley expansion bolt, a $\frac{5}{8}$-in. hex head nut, and a short piece of $\frac{3}{8}$-in. pipe plus armature nut welded to the bolt as shown in the accompanying sketch.

Before using the puller, the cover of the commutator end of the drill motor, the brush yoke and the nut holding the ball bearing must be removed. As the puller is set in place, the two $\frac{3}{8}$-in. slots in the arms of the puller are placed over two of the $\frac{5}{16}$-in. studs. Anchoring the puller in this manner prevents it from twisting out of position as the armature is removed by running down the nut on the puller bolt.

The puller, says Mr. Hitchcock, "saves the time of taking the cover off the pinion end, which is held with six Allen-head cap screws, and taking the clutch out and driving the armature out with a punch."



How the parts of the puller are assembled.

FOR *The* INDUSTRIAL DEMANDS *of* TOMORROW

The toughest fighting job is still ahead.

Today every ounce of our energy is being devoted to war-winning activities and will continue to be until Victory is ours.

But . . . . tomorrow will tell a different story . . . . then we can *again* assume our job of supplying industry engaged in peace-time and constructive production.

And . . . . for *your* Post War Planning — let the Red Strand be your guide in buying wire rope.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

IT'S TIME TO THINK OF POST WAR ECONOMY

TIME TESTED

CINCINNATI CHAINS *and* BITS

CUT COAL CUTTING COSTS

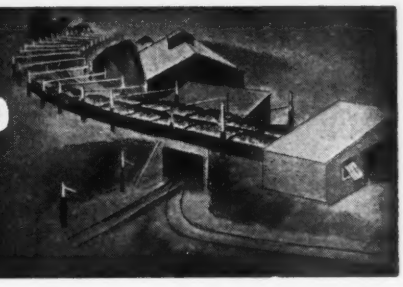
UNDER heavy war production schedules, Cincinnati sturdy, well engineered Chains and reversible double ended Bits are increasing production . . . lowering cutting cost and reducing maintenance requirements. When peace comes, you'll want this same fine performance plus "CINCINNATI" Economy. Makers of dependable coal cutting equipment for over 20 years.

CINCINNATI DUPLEX CHAIN

THE CINCINNATI MINE MACHINERY CO.

2983 SPRING GROVE AVENUE • CINCINNATI, OHIO

COAL AGE NEWS ROUND-UP



Scarce Soft Coals Under Close Control

To assure that communities completely dependent upon southern Appalachian mines for home heating coal may receive up to 90 percent of their normal supplies, Solid Fuels Administrator Harold L. Ickes issued a new regulation April 19 (SFA No. 23). Under this regulation, after Aug. 1 retail dealers in these communities must be supplied before coal can be shipped to retailers in communities where alternative coals are available. However, the war-vital coke and byproduct plants and the Great Lakes docks have priority over all retailers in purchasing southern Appalachian coals.

The regulation prohibits the mines from shipping more than 90 percent of these scarce coals to dealers in any area. At least 40 percent of all dealers' 90 percent quotas must be shipped prior to Oct. 1. The shipments to retailers will take precedence over shipments to industrial consumers, except those requiring the special-purpose and byproduct coals, and over shipments via the Great Lakes. Industrial users in some instances therefore will have to turn to alternative coals for current use and storage.

The preponderance of the 16,000,000-ton (reduced by increased output from the former estimate of 30,000,000 tons) soft-coal deficiency threatening the nation, it is pointed out by SFA, is in the southern Appalachian coals, essential to steel production and other war uses and widely consumed for space heating throughout the eastern half of the country. Because domestic users in the District of Columbia and the ten southeastern States depend almost exclusively on this coal for space-heating, dealers in this area are given first claim upon these coals after care is taken of the needs of byproduct plants and the Great Lakes docks.

Second preference among retailers is given to those in Michigan, Minnesota, Wisconsin, eastern Indiana, western Ohio and west Ontario. Dealers in all other communities, who have better access to alternative fuels, were placed in the third category after the quotas of retailers in the first two areas have been met. The regulation also directs commercial dock operators on Lake Superior and on the west bank of Lake Michigan to provide retailers in Michigan, Minnesota, North and South Dakota and Wisconsin with 90 percent of their normal supply of all coal after first filling requirements for by-product and other special-purpose coals.

Revised Regulation No. 21, announced July 22, also effective Aug. 1, applying to retail deliveries in the District of Columbia, all states east of the Mississippi River and to Minnesota, North and South Dakota, Iowa and Missouri, permits consumers in those communities to purchase from retailers their full 90 percent quotas of southern Appalachian coals before the heating season arrives.

COAL ACTIVITY

Bituminous Coal Stocks

Thousands

	Net Tons June 1 1944	P.C. Change From May 1 1944	P.C. Change From June 1 1943
Electric power utilities	15,713	+ 6.2	−21.4
Byproduct coke ovens	5,897	− 0.6	−36.0
Steel and rolling mills	765	+ 0.9	−30.9
Railroads (Class 1)	11,736	+14.5	−12.9
Other industrials*	16,494	+ 8.9	−42.3
Total	50,605	+ 8.0	−30.2

Bituminous Coal Consumption

Thousands

	Net Tons May 1944	P.C. Change From April 1944	P.C. Change From May 1943
Electric power utilities	5,851	+3.9	+ 6.4
Byproduct coke ovens	8,078	+1.9	+ 5.4
Steel and rolling mills	851	−3.2	− 3.0
Railroads (Class 1)	10,833	−3.3	+ 0.8
Other industrials*	11,100	−8.3	−12.3
Total	36,713	−2.8	− 2.8

* Includes beehive coke ovens, manufactured-gas plants and cement mills.

Bituminous Production

June, 1944, net tons	53,395,000
P.c. change from June, 1943	+55.3
January-June, 1944, net tons	319,085,000
P.c. change from Jan.-June, 1943	+12.0

Anthracite Production

June, 1944, net tons	5,618,000
P.c. change from June, 1943	+71.0
January-June, 1944, net tons	33,151,000
P.c. change from Jan.-June, 1943	+13.0

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Burners
May, 1944	2,455	2,102
P.c. change from May, 1943	+27.5	+71.0
January-May, 1944	9,159	11,618
P.c. change from Jan.-May, 1943	−5.7	+49.2

Index of Business Activity*

Week ended July 22	235.5
Month earlier	235.1
Year earlier	237.2

* *Business Week*, July 29.

Electric Power Output†

Week ended July 22, kw. hr.	4,380,930,000
P.c. change from month earlier	+1.3
P.c. change from year earlier	+4.4

† Edison Electric Institute.

Anthracite Starts New Consumer Drive

A new advertising campaign to enlighten consumers on the hard-coal situation and to obtain their cooperation with local dealers is being launched by Anthracite Industries, Inc., research and consumer education organization of the hard-coal industry. During the summer, quarter-page advertisements will appear in daily newspapers throughout the anthracite-marketing area comprising New England, New York, eastern Pennsylvania, New Jersey, Maryland, Delaware and the District of Columbia.

Written in factual, straight-from-the-shoulder language, sprinkled with vital statistics and illustrated with cartoon-type drawings, this series of ads will present the month-to-month picture. It will cite the difficulties encountered in getting anthracite equitably distributed from mines to consumer bins and point to the performance of all groups concerned.

Stress will be placed on the local dealer's problems, heightened by manpower shortages and limitations on deliveries. The consumer is reminded that the whole burden for the administration of Solid Fuels Administration Regulation 17 has fallen directly on the dealer's shoulders. This is the regulation limiting consumers to seven-eighths of their normal year's supply of anthracite. Its success depends upon the wholehearted cooperation of consumers with local dealers. The advertisements embody practical advice and give definite information on how to get the most heat from the least coal.

Headlined "We Did It Once—We'll Do It Again," the first advertisement tells how a national emergency was averted last year because the mines turned out 6,000,000 more tons with 18,000 fewer mines, because dealers worked overtime and consumers refused to become panicky, stretching their supplies to the limit.

•

Pittsburgh Coal Co. Lauds Steady Workers

A group of 178 miners of the Pittsburgh Coal Co. with outstanding work attendance records during the war has been given signal recognition by the company in newspaper advertisements and in a special edition of the Pittsburgh Coal Co. News dedicated to their achievement and carrying a congratulatory letter from Presi-

dent J. B. Morrow with 18 pages of pictures and short sketches of the men and their work records.

Eighty of the group were found to have been on the job every day the mines worked since the United States declared war on Dec. 8, 1941, a record which President Morrow hailed as "a remarkable performance" in view of the arduous nature of mining. The company's 16 mines, the Library shops and the Champion 1 preparation plant were represented.

Each of the miners at home received letters from President Morrow and Harry Suter, Regional Administrator for the Solid Fuels Administration, commending them for their efforts in helping to get out coal for the war effort. In addition to the News the men at the various mines received a folder with pictures of ten of their coworkers with the best records for work attendance.

Two of the miners pictured, Ignatz Krek and Wilson Critchley, of Lindley, near Houston, have been in the employ of the company since its organization in 1899. Another, Victor Pegoria, of Banning 1, has lost only four days' time in 44 years, attending funerals of relatives. William Lebe, of Euclid, near Smithton, has lost no time since Pearl Harbor, despite the fact that he has had the job of caring for a 53-acre farm.

•

FDR Plank Indorses Coal Legislation

Legislation affecting the bituminous coal industry came in for recognition at the Democratic National Convention with insertion of the following plank in the party platform: "We favor federal legislation to assure stability of products, employment, distribution and prices in the bituminous coal industry to create a proper balance between consumer, producer and mine worker."

•

Jewell Ridge Appeal Submitted to Court

Oral argument in the appeal taken by the United Mine Workers of America from the U. S. District Court decision in favor of the Jewell Ridge Coal Corp. in the matter of portal-to-portal pay was heard June 28 by the Circuit Court of Appeals, Fourth Circuit, at Asheville, N. C. Judge Parker presided, with Judges Soper and Dobie. Representing U.M.W. were Crampton Harris, Frank Rogets, Earl Houck and Mr. Golden, while George Richardson and William A. Stuart appeared for the Jewell Ridge Coal Corp. Edward R. Burke and John C. Gall represented the Southern Coal Producers' Association as friends of the court (*amicus curiae*).

Holding that travel time in a coal mine is the same as travel time in an ore mine, U.M.W. counsel cited that the Supreme Court, in the Tennessee Coal & Iron case, had ruled that such travel time in ore mines must be counted as part of the work week under the Fair Labor Standards Act. The union rested its case almost entirely upon the Supreme Court decision in the T.C.&I. case.

Contending that the Supreme Court decision in the iron ore case does not in any way require the same conclusion in the coal case, however, attorneys for the Jewell Ridge company and the Southern Coal Producers' Association pointed out that when the ore case was heard before the U. S. District Court judge in Alabama there was excluded from the evidence, on motion of Mr. Harris himself, all reference to the coal industry.

Pointing out many differences between the two cases, attorneys for the appellee and *amicus curiae* argued that when Congress passed the Fair Labor Standards Act it knew that there was a long-established and well-recognized work week in the coal industry which specifically excluded travel time therefrom. They argued, further, that Congress must have intended that the work week in fact should be the work week in exact language used by Justice Jackson in law. This argument was based upon his concurring opinion in the T.C.&I. case.

Frequent reference was made to the fact that the industry, with the exception of the Jewell Ridge Coal Corp., is now being operated on a portal-to-portal basis. But it was contended that this fact does not bear on the question at issue, which is whether the Fair Labor Standards Act requires that the portal-to-portal system of computing pay be used instead of the traditional face-to-face method.

•

Unrestricted Traffic On Lakes Extended

Because of favorable shipping conditions on the Great Lakes, permitting a larger movement of iron ore than had been anticipated, the Office of Defense Transportation has further suspended Order ODT 9A to Sept. 15, thus permitting unrestricted shipment of coal on the Lakes. Previously, ODT had promulgated a permit system to regulate lake shipment of coal. This was suspended last spring and this latest action merely extends the suspension.

•

Further Deferment To Key Men, 22-25

With the expiration on July 31 of the 90 days' deferment to critical men in the coal industry between the ages of 22 and 25 granted by the Selective Service System last spring, it became necessary in order to hold certain of these men and obtain additional deferments for others entering that age group or otherwise needed to have them certified for deferment by new 42-A Special applications. At first three years' experience was required before an exemption could be requested. This provision has now been eliminated, but it had to be clearly indicated on the form the number of years' experience each man has had. All data were required to be in the hands of field office administrators of the Solid Fuels Administration for War by July 20.

In the previous period of deferment, 42-A Specials were used only in nine critical states, whereas now all mining states are to be given certain deferment certifications and the nine critical states are to be given some increases. In the nine states covered by the first deferment the following increases were granted: Alabama, 143; Kentucky, 198; Maryland, 7; Pennsylvania, 218; Tennessee, 30; Virginia, 135; Washington, 9; West Virginia, 238; Wyoming, 44; Pennsylvania anthracite, 376.

Distribution by age groups and classification of employees in the two divisions of the coal industry, as compiled by SFAW from individual reports, was as follows:

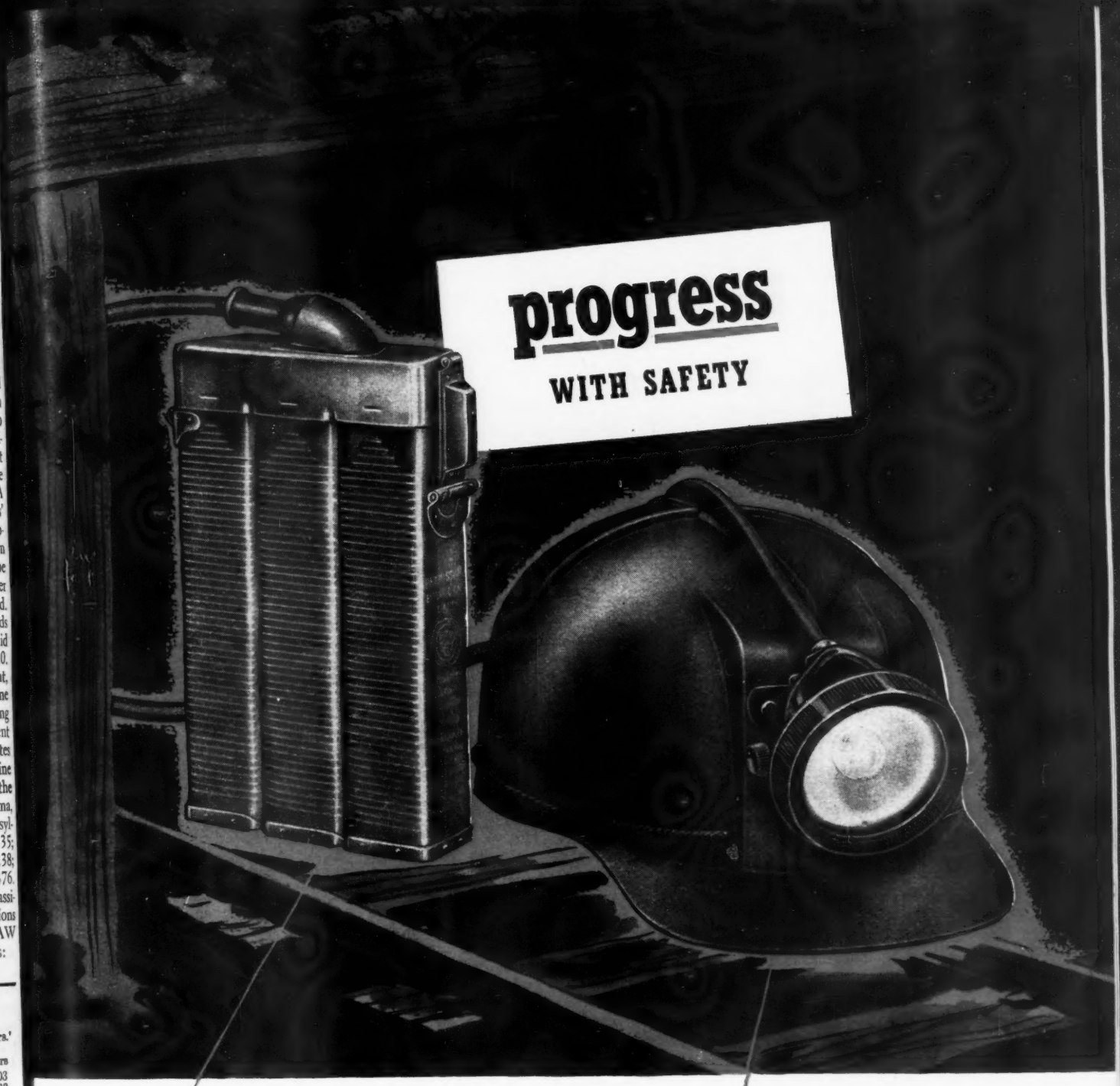
BITUMINOUS COAL AND LIGNITE

Age Groups as of Aug. 1, 1944	Total All Employees	Three Yrs.' or More Mining Experience Deferred by 42-A Specials: Class 4F	Three Yrs.' or More Mining Experience Deferred by 42-A Specials: Others	Less Than 3 Yrs.' Experience: Class 4F	Less Than 3 Yrs.' Experience: Others
21 yrs. and under	11,648	1,402	.....	1,076	4,667	4,503
22–25 inc.	19,472	5,347	5,585	4,239	2,218	2,033
All inside men*	15,819	4,328	5,138	3,399	1,591	1,462
Outside, skilled†	1,619	464	349	492	156	168
Outside, others	2,034	555	98	507	471	403
26–29 inc.	37,043	6,276	.....	26,883	1,162	2,722
All inside men*	30,372	5,027	.....	22 712	749	1,884
Outside, skilled†	3,643	647	.....	2,535	134	327
Outside, others	3,028	602	.....	1,636	279	511
30–33 inc.	46,463					
34–37 inc.	47,566					
38–44 inc.	77,006					
45–64 inc.	152,615					
65 and over	10,186					
Total	401,999					

ANTHRACITE

21 yrs. and under	1,000	110	.....	73	402	415
22–25 inc.	2,158	472	477	427	415	367
All inside men*	1,460	296	417	257	234	256
Outside, skilled†	234	58	33	83	31	29
Outside, others	464	118	27	87	150	82
26–29 inc.	5,099	698	.....	3,524	262	615
All inside men*	3,907	430	.....	2,868	142	467
Outside, skilled†	515	109	.....	319	38	49
Outside, others	677	159	.....	337	82	99
30–33 inc.	7,514					
34–37 inc.	9,232					
38–44 inc.	16,913					
45–64 inc.	36,304					
65 and over	2,257					
Total	80,477					

* In strip operations, pit employees included as inside labor.
† Includes skilled labor, such as carpenters, mechanics, blacksmiths, etc.



EDISON ELECTRIC CAP LAMPS MSA COMFO CAPS

Keeping pace with coal mining progress since Thomas Edison's introduction of electric cap lamps underground, the Edison Lamp supplies safe, brilliant illumination which is a model of unfailing dependability . . . *light* of highest quality for better man-safety, better production tonnage, better service to the Nation.

Edison Electric Cap Lamps, powered by the famous Edison Alkaline Battery, offer unparalleled long life in service. Paired with the sturdy M.S.A. Comfo Cap for proved head protection, this winning combination aids miner and management in today's great production program!

MINE SAFETY APPLIANCES COMPANY
BRADDOCK, THOMAS AND MEADE STREETS · PITTSBURGH, PA.
District Representatives in Principal Cities

IN CANADA
MINE SAFETY APPLIANCES COMPANY OF CANADA, LIMITED
TORONTO . . . MONTREAL . . . CALGARY . . . NEW GLASGOW, N. S.

For outstanding production achievement . . . the Maritime "M" Pennant with added Gold Star, and Victory Fleet Flag, awarded to M. S. A. by the U. S. Maritime Commission.

Plan Development Of Anthracite Properties

Sizable development of properties in the Southern anthracite field are in contemplation by T. Henry Altmiller, president, Mahanoy Coal Mining Co., Hazleton, Pa. He and his associates have leased from the Lehigh Valley Coal Co. the Centralia and Primrose collieries. They plan to drive several tunnels at Centralia to mine the Mammoth vein, and at Primrose a new breaker is to be constructed to prepare the coal mined at both properties.

•

British Coal Industry Shows Decline

Decline of the British coal industry since 1938 is shown in statistics in a White Paper made public July 8 by Major Gwilym Lloyd George, Minister of Fuel and Power. Strikes in the first quarter of this year alone cost Britain the loss of 1,564,100 man-shifts and 2,000,000 tons in output.

Output last year was 202,983,800 tons compared with 211,468,200 tons in 1942. Workers employed in the mines have fallen from 781,700 in 1938 to 707,300 men and boys in 1943. The average weekly cash earnings of miners in 1938 were £2 15s. 9d. compared with £5 in 1944.

Provisional figures for coal consumption, including export and bunker demands, which registered a slight drop because of the government's campaign for economy, showed for the 1942–43 period 199,200,000 tons and in the 1943–44 period 198,200,000, of which 43,356,000 tons went to industry.

Stocks, which increased by 500,000 tons in 1941–42 and by 4,700,000 in 1942–43, have dropped 1,300,000 tons since.

•

New Production Nearly Ready

Bell & Zoller Coal & Mining Co., Chicago, is completing arrangements to open a coal mine at Murdock, Ill., 35 miles southeast of Champaign. This is expected to produce 1,000,000 tons annually for the Chicago market and nearby areas. The mine will be on the Baltimore & Ohio R.R. and will have easy transfer facilities a few miles away to both the Illinois Central and the Chicago & Eastern Illinois railroads. The company, it is reported, plans to have 6,000 acres of coal lands under lease this summer.

The Binkley interests, Chicago, are opening a new strip mine near Bicknell, Ind., under the name Shasta Coal Corp. The 950-B stripping shovel from Bobolink mine, Seeleyville, Ind., is being erected at the new mine. A 75-B shovel will load the coal and a coal washery will be built on the property. The No. 6 coal, with a thickness of 4½ ft., will be mined. Production is expected to begin next month.

A new slope mine will be opened this autumn one mile east of Johnson City, Ill., by the Consolidated Coal Co. The new operation will be one mile east of the old Lake Creek district mine which was closed several years ago. The company will transfer to the new plant some workmen from its Buckhorn mine, near Herrin, Ill.

•

Funds Provide For Anthracite Studies

Provisions in the new appropriation bill include $81,000 for the U. S. Bureau of Mines for anthracite research. Under direction of the Bureau, these studies will be made: increasing man-day production by mechanization, mine drainage, and flood control. Before the program gets under way, it is planned to have a committee of anthracite operating men confer with Bureau officials.

•

Thomas Group Buys Southern Coal & Coke

The largest coal-mine-property deal in the Alabama field in recent years was consummated June 30, when the newly organized Boothton Coal Mining Co. purchased the holdings of the Southern Coal & Coke Co. at Boothton, Shelby County. The new company is headed by D. A. Thomas as president and treasurer; Hugh Morrow Jr., vice president, and N. E. Keyes, secretary. The property acquired includes four slope mines in operation, two preparation plants, dwellings, mine buildings and land.

The four slope openings of the Boothton Coal Mining Co. are on the Gholson and Clark seams and have a capacity of 1,500 tons daily, served by connections with the Southern and Louisville & Nashville railroads. The company will maintain a sales department headed by E. D. Reynolds as sales manager and will handle the disposition of its product to the trade.

The Southern Coal & Coke Co. properties were developed by George F. Peter, who, with Mrs. Peter, owned and operated the mines until their disposition to the new interests. A native of Pennsylvania, he was one of the pioneers in the Alabama coal industry, where he has been a successful operator for the last 49 years.

•

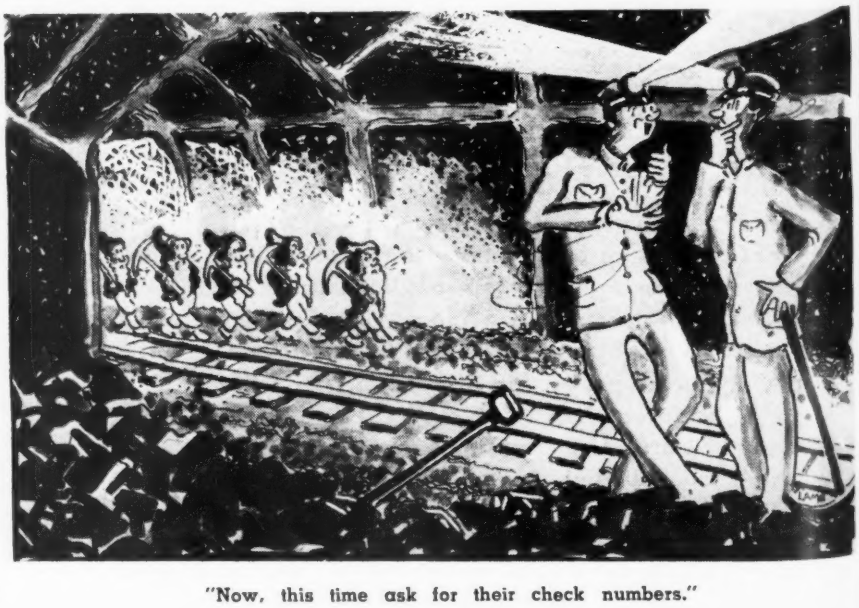
Byproduct Coke Oven Construction Begun

Animated by record demand for steel and chemical byproducts of coke, the Aliquippa works of the Jones & Laughlin Steel Corp., near Pittsburgh, Pa., began July 16 the construction of 106 byproduct coke ovens to cost $7,500,000. The contract for the ovens has been let to the Koppers Co. and the project is to be completed in 14 months. The new ovens, which will produce about 59,000 tons of metallurgical coke per month, will increase the coking capacity of the Aliquippa works by 50 percent and the company's over-all coking facilities by 20 percent.

•

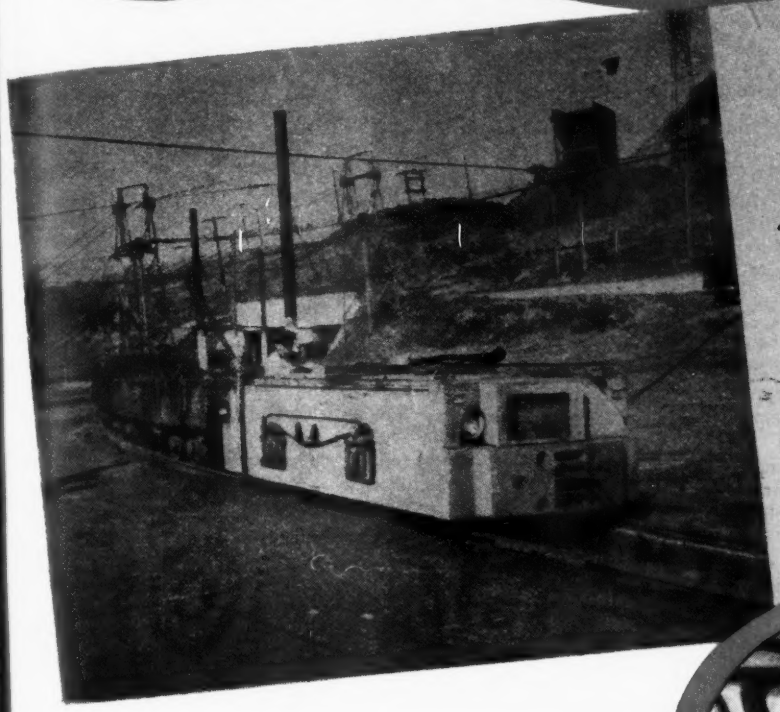
ODT Issues Orders For Motor Trucks

Issuance of certificates for purchase of new commercial motor trucks was begun by the Office of Defense Transportation July 5 under the new program giving that agency complete control of the rationing of such equipment. Applications for certificates will continue to be filed with the nearest ODT district office. District managers will either recommend approval or disapprove each application, sending approved applications to Washington for final action and returning those disapproved to the applicants. Local appeal boards have been established to consider appeals from decisions of district managers, and the action of the board is final. Pending issuance of a new ODT form, Form WPB 663 may be used until Sept. 1.

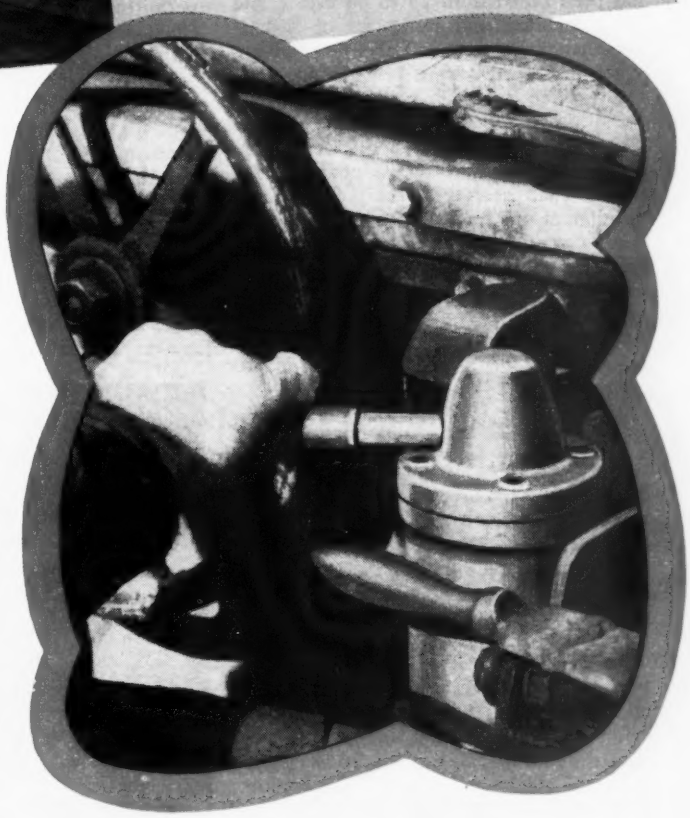


"Now, this time ask for their check numbers."

Taking it Away Faster



with WESTINGHOUSE HYDRAULIC BRAKE



SPOTTING
GATHERING
HAULAGE

Mine locomotives move at a faster pace when equipped with this quick acting power brake.

Its quick response permits accurate spotting.
Its graduated control permits faster gathering.
Its braking power permits haulage of greater tonnage at higher speeds—safely.

The exclusive "pressure graduating" type of brake valve adjusts the brake pressure up or down in large or small steps as the handle is moved forward or back. Operation is just about effortless and the handle itself holds its position for any pressure.

Compactly designed to meet space limitations on small locomotives, the brake system is easily applied without changing the standard brake levers. It can be installed when locomotives are in the shop for their regular overhaul.

WESTINGHOUSE AIR BRAKE CO.

INDUSTRIAL DIVISION - WILMERDING, PA.

Nova Scotia Records Its Progress

Electrification, Hoisting, Shaft-Raising and Pumping Developments at Dominion Coal's Mines Described — Medals to Four Heroic Men—Scholarship Awarded

PROGRESS in electrification and in hoisting at the mines of the Dominion Coal Co., raising of a shaft from one submarine coal seam to another and operation of centrifugal pumps occupied the attention of the members of the Mining Society of Nova Scotia at its annual meeting at Kentville, N. S., July 6 and 7.

In 1928, all the collieries of the Dominion Coal Co. were still supplied with 6,600-volt, 3-phase, 25-cycle current but stepped down on the surface to 2,200-volt for underground transmission, said E. L. Martheleur, chief electrical engineer, Dominion Coal Co. Only two modest attempts had been made at that time to operate motors underground directly at the higher voltage. These motors were driving pumps, and subsequently were reconnected for 2,200 volts. Today, 6,600 volts is standard for underground transmission. This voltage is extended under the sea as far as four miles from the shaft bottom. Interruptions from cable trouble are remarkably infrequent when it is remembered that 39.6 miles of cable is being used underground.

Since 1928, the frequency of the system has been raised from 25 to 60 cycles, and the difficulties and intricacies of making this change for motors of about 42,000-hp. aggregate capacity were bewildering, especially when part of a switchboard was operating on 60-cycle current and part on 25-cycle. Sometimes there were dual feeders underground and sometimes large motors such as hoists, compressors, etc., operated at one frequency, while the auxiliaries were being driven by current of a different frequency. To make the change took over ten years, and today 95 percent of the work has been completed. But five compressors, two hoists and a few smaller motors still remain to be converted to 60-cycle power.

Why Change Was Made

The system was revised because it was advantageous for the coal company to have the same cycle as the Dominion Steel Co. at Sydney, and because, between the limits of 300 r.p.m. and 3,600 r.p.m., twelve synchronous speeds are available on the 60-cycle system and only five speeds on 25-cycle, said Mr. Martheleur. When pumps were installed at the 3,300-ft. level in No. 2 Springhill mine, equipment to run at either 1,800 r.p.m. or 3,600 r.p.m. could be purchased, but an 1,800- r.p.m. pump would have required 16 stages as against 7 stages for a 3,600-r.p.m. pump.

The highest speed obtainable for a 25-cycle pump was 1,500 r.p.m., and the pump would have been so long as to require that two pumps be provided in series at the lower speed, which would have demanded twice the space and cost twice as much as the higher-speed pump. Weight and space occupied by a two-pole, 6,500-kw., 25-cycle, turbo-generator at the Waterford Lake power plant compares closely with the weight and space occupied by a two-pole 16,500-kw., 3,600-r.p.m. generator recently installed at the No. 3 power plant at Sydney.

More Cycles, Higher Speed

When the speeds are identical, 25-cycle motors cost about the same as 60-cycle motors, but the use of a higher-speed motor for the same horsepower possible with a 60-cycle unit, reduces the purchase price of the latter. The reduced speed required with the 60-cycle motor per unit permitted electricity to be used for coal cutting, which would be impossible with 25-cycle motors. Though the price of 60-cycle and 25-cycle motors as compared on the basis of horsepower and approximately on the basis of speed is much the same, the cost per kva. of the 25-cycle transformer is, in general, twice that of the 60-cycle transformer.

The change of frequency made possible a direct intercommunication between the systems of the coal and steel companies, permitting two of the oldest and less efficient power plants to be closed down and making savings which repaid several times the cost of changing the frequency.

For the 6,600-volt current, cable specifications are: 3-phase, sectoral-conductor, paper-insulated and lead sheathed with jute served over the lead. This cable is finally armored with single wire, which armor the manufacturers recently have been asked to cover with an acid-resisting compound, because the cables are generally suspended and, when the suspension breaks, the cable may fall into corrosive water.

Even where cables used below ground may transmit only 2,200 or 550 volts, they are insulated for 6,600 volts because they will have to carry the larger voltage when the mine has been extended and because it is difficult to distinguish a cable built for one voltage from a cable built for another when they are of the same size. For standardization, only 4/0 and 1/0 cable are used. When larger cable is needed two or three cables are paralleled. For ease in transportation, they are cut into lengths of 300 or 500 ft., according to conditions.

The substations below ground have capacities varying from 150 to 2,000 kva. Large substations are built in units of 500 kva., which appear to be as large as the mine galleries will accommodate.

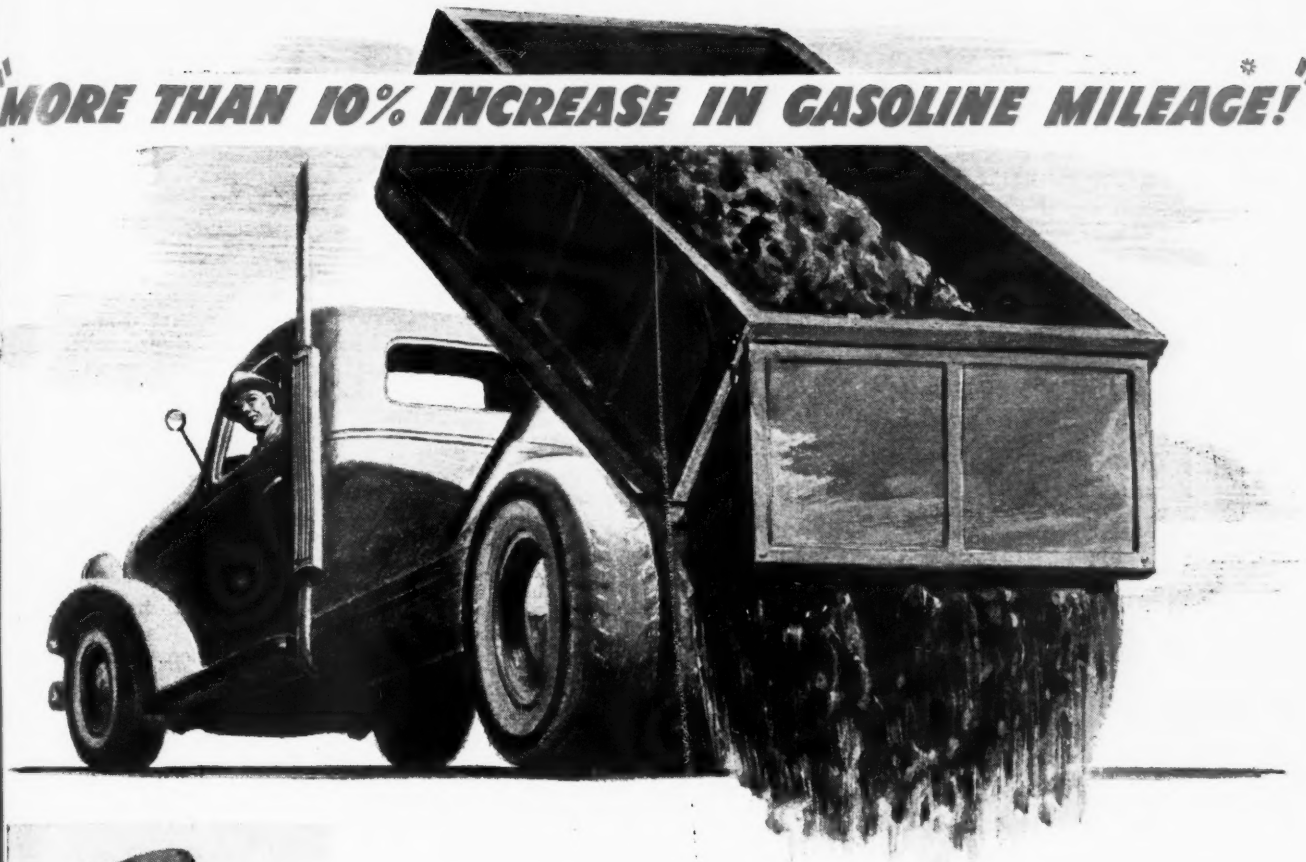
Despite all precautions, these large oil-filled transformers are always a potential hazard, but the Mines Department has now authorized the use of dielectric liquids such as pyranol, inerteen and the like. Before such authorization and whenever possible, 6,600-volt motors direct-connected to the supply were used, with English transformers of low height. These transformers are not now available, but, as a fair stock was carried, it has been possible to continue their use by transfering some transformers from surface installations where height was no objection.

Favor Liquid Controllers

All controllers consisting of the conventional flameproof reversing drum and cast- or malleable-grid resistance have been discarded, because on several occasions overheated resistors have started fires. Oil-immersed resistors are both expensive and dangerous. The less oil used in the mines the better. Drum controllers and metal resistors have been replaced by liquid

Some participants at sessions of the society's Kentville meeting.

"MORE THAN 10% INCREASE IN GASOLINE MILEAGE!*"



Ring-Free removes carbon. Keeps pistons clean, rings free. Reduces power loss.

Ring-Free's high film strength and long cling make bearings last longer, even under overloads.

Ring-Free holds foreign particles in suspension . . . stops sludge formation, reduces port clogging.

You'll move more tons of material per gallon of fuel consumed if you use Macmillan Ring-Free Motor Oil. That is a simple statement of fact, and the reasons are very easy to explain.

It takes *power* to move material. It also takes power to *overcome internal engine friction.* The more internal friction is reduced, the more power you'll have for hauling material, or other productive work.

Ring-Free Motor Oil cuts friction-power-loss materially, because it *reduces friction fast.* It lubricates better because it removes carbon, has high film strength, long cling and thorough penetration.

***TESTED AND PROVED ON THE JOB**

Operators everywhere find their engines run better and last longer when lubricated with Ring-Free. Power is increased, shut-downs and repairs are decreased. Operating and maintenance costs go down, production and profits go up.

You, too, will notice *immediate improvement* when you change to Ring-Free. Give it the hardest tests you can, on your toughest jobs. It will effectively answer many of your difficulties.

**"For the past seven years I have been using Ring-Free Motor Oil in my fleet. I get from seventy to eighty thousand miles before changing motors or being forced to make any major repairs. I never have any sticky valves and but slight traces of carbon, and my gasoline mileage has increased more than ten per cent."*

Henry J. Schafer, Jr., Pres.
Schafer Brothers Trucking Corp.

MACMILLAN RING-FREE MOTOR OIL

MACMILLAN PETROLEUM CORPORATION

30 W. 50th St., New York 20, N. Y.; 624 S. Michigan Ave., Chicago 5, Ill.; 530 W. Sixth St., Los Angeles 14, Calif.

Copyright 1944 Macmillan Petroleum Corp.

controllers, consisting of three fixed and three movable electrodes immersed in a solution of carbonate of soda.

The electrodes are raised and lowered by a lever on the operating platform. Where the hoists are small, the levers are moved by hand and where they are large, by a servo-motor. Since the electrodes always are submerged, flashing is prevented and flameproof inclosures are not needed. Liquid controllers are favored by the company's engineers and colliery managers because they are safe and accelerate the rope without jerking. For long hauls at reduced speed, the electrolyte is cooled by water circulating in a nest of cooling tubes.

No part of a hoist requires as much attention as the reversing switch. Theoretically this equipment consists of two sets of contactors immersed in oil and operated from the operating platform. One set gives the forward and the other the reverse direction; both sets of contactors are mechanically and electrically interlocked so that a dead short circuit will be prevented should both be closed simultaneously. In the past, these reversers were manufactured up to 2,000-hp. Oil-immersed reversers are in use today at No. 12 colliery relay hoist (1,200-hp.), at No. 5 Deep, 1B colliery (1,200-hp.) and at No. 16 colliery relay hoist (1,500-hp.). They are operated either manually, electrically or by compressed air. A few years ago, construction of these large reversers was discontinued, the largest flameproof reverser now obtainable being rated at 500 hp., with 2,200-volt current.

Explosion-Proof Vault

At the time the large hoist at No. 4 colliery, Springhill, was being designed, manufacturers had nothing to offer but air-break magnetically operated reversing switches, which, for obvious reasons, could not be installed underground. Accordingly the chief mechanical engineer of the coal company, J. A. Russell, conceived the idea of inclosing the air-break reverser in an explosion-proof vault kept under a pressure of fresh air. All the hoist auxiliaries which otherwise would have been inclosed in individual flameproof inclosures were lodged in the same vault, which was about 11 ft. long, 9 ft. wide and 10 ft. high, with heavily reinforced-concrete walls 10 in. thick and entered by a steel door 6 ft. high and 3 ft. wide, bolted and hinged to the door frame. A heavy porthole permits observation from the outside.

Compressed air at reduced pressure is admitted to the vault through a 1-in. pipe, pressure in the vault being maintained at 2 to 4 lb. per square inch. A sensitive Mercoid pressure gage causes the control circuit to open, thereby cutting the supply of electricity to the installation should the pressure of air in the vault drop below a value of 3 to 2 lb. Air is allowed to escape continuously so as to prevent ozone from accumulating in the vault and to make sure that the air is not contaminated with methane.

The Canadian General Electric Co. has developed for the Dominion Coal Co. the first air-break magnetic switch capable of breaking and reversing large currents at 6,600 volts, which is quite a problem because, during a shift, the current is broken and reversed several hundred times, and arcs are drawn over 1 ft. long. The engineers put two sets of contactors in series in each phase so as to reduce the blistering effect of the arc.

To the Canadian General Electric also goes credit for the design of a reversing switch of smaller dimension (up to 500 hp.) which is flameproof and embodies all the safety devices of those built according to British regulations.

Dampness Does It

The principal cause of failure of 6,600-volt motors installed underground is dampness. Mine air always is humid, and the coils absorb this water when, over weekends, the motors become cool, thus causing creepage which finally destroys insulation and results in burnouts. This weakness was overcome by inserting heaters in the stator laminations; which heaters are connected to a source of power at 220 volts by an auxiliary switch which closes the heating circuit when the primary switch is off and opens it when the switch is on and the motor running. The stator coils are thus kept fairly warm at all times and burnouts are infrequent.

Though the high-voltage power cable type has not changed greatly, the trailing cable used for coal cutters and other portable machinery has been modified to include a shielding of very small copper wiring around the insulated conductor and a ground wire at the center of the cable. The shield of each conductor is in contact with the ground wire, which is itself connected to the earth-leakage relay embodied in the remote main switch. Whenever the cable is crushed or cut it is impossible for two phases to come in direct contact before the phases come in contact with the shield; this trips the switch instantaneously, preventing arcs from forming at the injury.

Vaults to inclose non-flameproof equipment are applied also to meet the exigencies of automatic pumping. The new parts of the equipment, such as pressure regulators, pressure relays, timing relays, etc., are not built with flameproof protection because in general industrial use they are not located in a methanous atmosphere, but whenever such inclosure is justified nothing prevents all this subsidiary equipment being inclosed in a small steel box built of boiler plate with machined flange and flameproof outlets.

Some pumping stations of the Dominion Coal Co. have been equipped with automatic devices, and the results so far have been very promising. The pumping units start and stop for certain conditions of water in the lodgment and also between predetermined times. They are fully protected against loss of suction, low discharge head, overload, etc., and can be protected against overheating of the motor or any part of the equipment, thus being made absolutely safe against mishaps. Two pumping stations at No. 18 colliery were so equipped, and thus far they have required only a casual visit from the colliery electrician whenever his duty calls him in the vicinity. The saving is appreciable, especially as the cost of the equipment does not exceed $500.

Peak Load 8,000 Kw.

Connected load underground in 1924 was 2,777 hp., in 1928 was 6,812 hp. and in the present year 20,012 hp. The peak load of one of the Dominion Coal Co. collieries is over 8,000 kw. or 10,700 hp., and four miles under the ocean this company has just installed a relay hoist of 1,800 hp.; in the same mine a relay hoist of 600 hp. is just being installed which will serve as relay for another relay hoist of 1,200 hp.

Over and above its large consumption of electrical energy, this colliery has an electrically driven plant delivering 14,000 c.f.m. of compressed air at 100-lb. pressure per square inch. The energy demand of this plant alone is 2,600 hp.

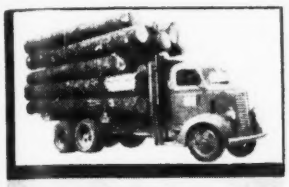
The introduction of compressors underground is under consideration and a preliminary study has been made of a projected unit, a 3,000-c.f.m. compressor driven by a 600-hp. synchronous motor which, it is expected, will be installed as soon as No. 26 colliery (working the Harbour Seam through No. 1B colliery) is in steady operation.

Small compressors can be operated without difficulty because they dissipate only a small quantity of heat, but with large compressors the removal of this heat is a problem. One kw.-hr. of energy is equivalent to 3,415 B.t.u., so there will be

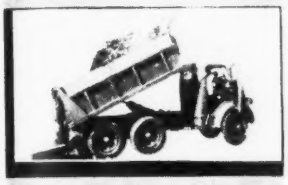
NOVA SCOTIA OFFICERS

President for 1944-45—Dr. Alan E. Cameron, Deputy Minister of Mines, Nova Scotia, Halifax, N. S.; first vice president — W. S. McDonald, general superintendent, Dominion Coal Co., Glace Bay, N. S.; second vice president; S. A. Willis, manager, Canada Gypsum Co., Windsor, N. S.; secretary-treasurer, Sydney C. Mifflen, office engineer, Dominion Coal Co., Sydney, N. S. Councillors—J. P. Messervey, mining engineer; T. J. Casey, chief inspector of mines, Nova Scotia Department of Mines; H. J. Kelley, vice president; Dr. F. W. Gray, assistant general manager; E. L. Martheleur, electrical engineer, Dominion Steel & Coal Corp.; T. L. McCall, general manager; E. Beaton, manager 1B Colliery; J. R. Dinn, coal inspector; H. H. Hines, assistant general superintendent; W. L. Stuewe, mechanical superintendent; Angus McDonald, manager, No. 12 colliery, Dominion Coal Co.; J. C. Nicholson, mining engineer, retired; H. C. M. Gordon, president, Old Sydney Collieries; E. B. Paul, resident superintendent, Cumberland Ry. & Coal Co.; A. E. Flynn, professor of mining, Nova Scotia Technical College; S. G. Naish, eastern manager, Peacock Bros.

HOW TO MAKE YOUR MEDIUM TRUCK EARN MORE MONEY

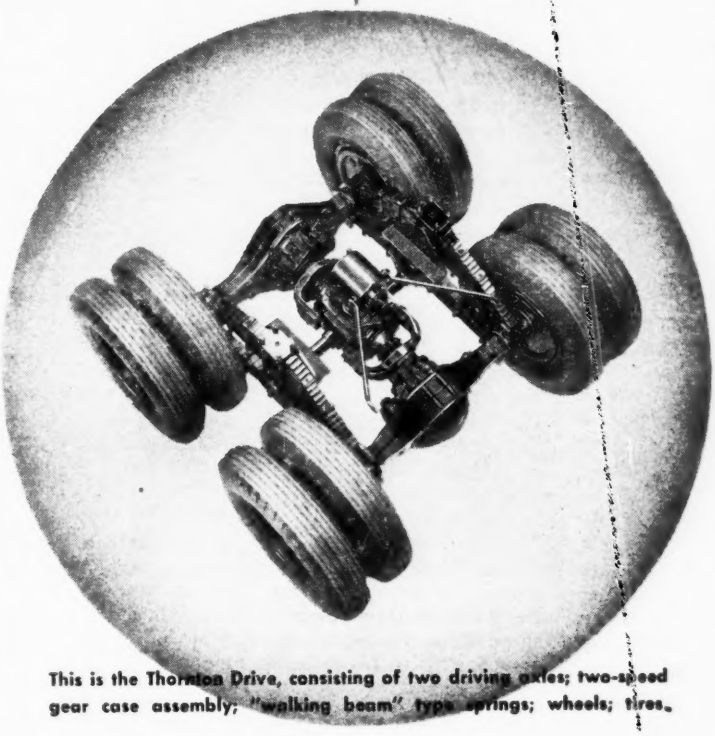


LOGGING

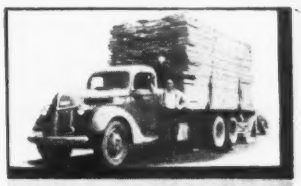


MINING

GENERAL HAULING

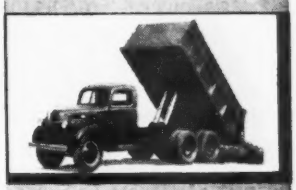


This is the Thornton Drive, consisting of two driving axles; two-speed gear case assembly; "walking beam" type springs; wheels; tires.



LUMBERING

OIL PRODUCTION



DUMP TRUCK WORK

ADD THE THORNTON *FOUR REAR WHEEL* DRIVE! CONVERT IT INTO A HEAVY DUTY TRUCK

Whether you own, or expect to buy, a medium truck, you both save and make more money when Thornton properly engineers and installs this 2-drive axle BOGIE, thus converting a 1½-2 ton medium truck into a powerful, 6-wheel heavy duty truck, capable of delivering 100% *more* rim-pull which permits hauling 100% *more* payload through sand, mud, muck, snow, over ice and up steeper grades.

- Make your converted truck do double duty . . . haul twice as much . . . earn more money.
- Write today for full particulars.

You SAVE on

√Investment, operation, upkeep.

√Gas, oil, tires, chains, wages, manpower, insurance, time-delivery schedules.

NO PRIORITY

Installations readily available.

THORNTON TANDEM CO.

8715-A GRINNELL AVENUE • Plaza 9700
DETROIT 13, MICHIGAN, U.S.A.

Investigate THORNTON *Automatic-Locking* DIFFERENTIAL for Replacement in Truck Axles

In Canada see: H. V. WELLES, LTD., Windsor

Thornton Tandem Co.
8715-A Grinnell Avenue
Detroit 13, Michigan, U.S.A.

Please send me catalog of facts on changing my 1½-2 ton truck into a heavy duty truck.

Name_____

Address_____

City_____ State_____

Make of Truck_____ Year_____

Used for_____

1,680,000 B.t.u. per hour to be carried away. Ultimately, this heat must be removed by the ventilating current.

The water used for the inner- and after-coolers and the water jacket of the compressor will be cooled by a heat exchanger in which mine water will be the cooling medium. This mine water will find its way by gravity to the pit bottom, where it will mix with other water collected from other parts of the mine and ultimately will be pumped to the surface. Clean air is no more difficult to obtain underground than in a surface plant. Since 1932, some 2,500-c.f.m. compressors have been installed and are working successfully inside the Wabana ore mines.

To carry compressed air four miles underground is an uneconomical practice, declared F. W. Gray, assistant general manager, Dominion Steel & Coal Corp. The mines being under the sea, the air cannot be conveyed where it is needed, except by compressing it where it is to be used. Because of the depth of the mines near the working face, stated William Wilson, mechanical engineer, D. S. & C. Co., more compressed air can be obtained from the compressor, for the air already is compressed when it reaches the latter.

Biggest Underground Hoist

The most recent large hoist of the Dominion Coal Co., declared J. A. Russell, chief mechanical engineer, Dominion Coal Co., has just been put into operation in the 7th Deep (slope) of No. 1B colliery. It has two drums, 8 ft. in diameter and 4 ft. wide with flanges 18 in. deep to accommodate 8,000 ft. of $1\frac{3}{8}$-in.-diameter rope, and is designed to hoist trips of 17 cars, each weighing 3 tons gross, at a speed of 1,350 f.p.m. (J. D. Stewart, in a written communication read later by S. G. Naish, eastern manager, Peacock Bros., stated that this hoist is one of the world's largest underground installations, that it may take precedence over all other underground hoists and that it is notable also, in that no other hoist is located as far from the mine entrance).

The motor driving the hoist runs at 700 r.p.m. and develops 1,800 hp. through a double-reduction double-helical gear running in an oiltight case. Its clutches are of the radial-tooth positive type sliding on octagonal shafts and operated by compressed air. In this case, the rope length does not need to be adjusted with extreme accuracy, so the clutches have a diameter of only 4 ft. 6 in.

Describing the No. 12 colliery main hoist, which had a 30x48-in. two-cylinder corliss non-condensing engine, 8-ft. drums measuring 4 ft. between flanges 17 in. deep, and operated at rope speeds as high as 3,000 f.p.m., Mr. Russell said that the clutches were of the internal-gear type with 50 teeth on a 3-in. pitch and 5-in. face, many more teeth than were necessary to transmit the load. For this reason, 28 were removed from each of the clutch rings with an immediate improvement in operation. With a little fitting all the teeth came to a good bearing and, as operation polished them, they soon operated well. Before that, because it was difficult to get a proper bearing and suitable surface on all the many teeth, the clutch at the end of a hoist could not be disengaged except by stopping the unit and using sledge hammers and crossbars. After some months of operation, the feather keys on which the clutch slid no longer stood up even when made of tool steel and when, a few years later, the drum shaft broke, the engineering staff provided a new shaft with octagons on which the clutch would slide, which then gave no more trouble.

Commenting on Mr. Russell's remarks, S. R. Newton, vice president and chief engineer, Canadian Ingersoll-Rand Co., in a communication read by W. S. Wilson, mechanical engineer, Dominion Coal Co., declared that a clutch can have too many teeth and that a sliding hub of any design should be fitted over a hexagon or octagon section of the shaft.

The Cramp internal expanding jaw-type clutch, though it has more parts than the clutch, consisting of a ring with internal cut teeth and a driver having fewer teeth, as described by Mr. Russell, has the compensating advantage that the clutch can be engaged with less jockeying of the drum because of the V-shaped profile of the teeth, especially with shafts that have a vertical lift where the clutch may have to be engaged and disengaged frequently.

All-Steel Construction

The largest parts of the new hoist at 7th Deep, which a few years back would have been heavy and of more or less unreliable cast metal, are now of steel; the bed is made of rolled-steel sections, the drums of welded steel (the first drums of like size to be used by the company) and the motor stator is of mild-steel plate. All this, said S. G. Naish, eastern manager, Peacock Bros., reading a communication of John D. Stewart, Dominion Coal Co., reduces the weight of the hoist, improves its appearance and makes it absorb less power in its own operation than those performing similar service a few years ago. This economy in self-movement results from the decreased weight of the revolving parts, from improved bearings and their system of forced lubrication and from the precision with which the cut teeth of the gears are made and their condition maintained due to the wear-resisting steel of which they are constructed.

If care is taken to have a hoist room of bright and attractive appearance, the engi-

DO IT NOW

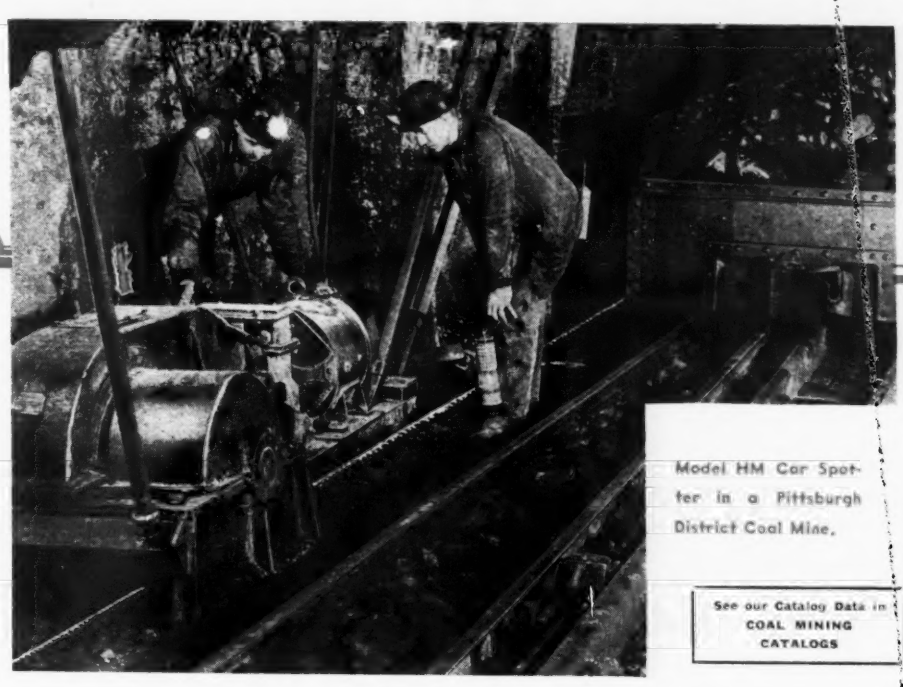
Every pound of paper you save today represents manpower saved in cutting, hauling and shredding trees to make packaging lumber, carton and boxes. Save every scrap for the big scrap we've got to win. Ranking beside war bonds and blood donations is this job that anybody can do—saving the paper that our mills must have to package fighting supplies.

ON THE JOB IN GREAT BRITAIN

Members of the United States Coal Mission to Great Britain in conference with British coal officials upon their arrival in the Isles. Reading to the right from W. F. Hahman, SFA (in light suit) are Paul Weir, consulting engineer; Carl T. Hayden, Sahara Coal Co.; Oliver Lyttleton, British Minister of Production; A. S. Knoizen, mission head; Major Gwilym Lloyd George, British Minister of Fuel and Power; George A. Lamb, assistant director, U. S. Bureau of Mines; R. H. Swallow, Ayrshire Patoka Collieries Corp.; R. G. Lazzelle, Island Creek Coal Co.; H. O. Rogers, mission secretary; and T. G. Gerow, Truax-Traer Coal Co.

(British Combine photo)

A TESTED METHOD
of Keeping Pace with the Loaders



Model HM Car Spotter in a Pittsburgh District Coal Mine.

See our Catalog Data in COAL MINING CATALOGS

"BROWN-FAYRO" Automatic Car Spotter

Back: **"If we're going to keep pace with the loaders, we've *got* to get the cars under the conveyor FAST."**

Forth: **"That's easy, where the boss has equipped our mine with B-F Automatic Car Spotters."**

Back: **"I've watched the B-F work and it keeps the cars under the conveyor when it's handling 6 tons a minute. How can it do that?"**

Forth: **"The B-F Car Spotter moves the trip of cars by means of a barney set in guides between the rails. It pulls the cars ahead exactly one car length, under control of the operator and the limit switch."**

Back: **"Then the barney goes back to its original position, I suppose."**

Forth: **"You're right. And it shifts the cars ahead another car-length, as quick as the operator pushes the button."**

Back: **"How about power?"**

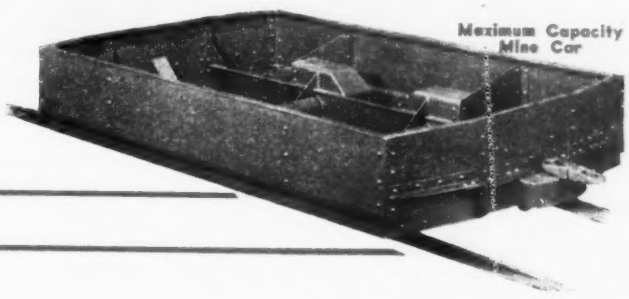
Forth: **"The B-F Car Spotter is rated at 12,000 lbs. line pull at 40-ft. a minute, and a back haul speed of 60-ft. a minute. Plenty of power for a long trip, empty or loaded."**

There are many other TESTED METHODS of increasing production and bettering coal mine maintenance, with B-F coal mine equipment.

The outstanding fact about B-F equipment is that it is *built for coal mine operation*—not a makeshift adapted from some other line of industry or the construction field. Being mining equipment specialists, and living close to our mine friends, we are familiar with coal mine conditions—and meet them—both in the bituminous and anthracite fields.

See the full list of B-F Products opposite. Look them up in the Coal Mining Catalog, or write for our latest Bulletins.

Hoists—Room, Car Spotting, Layer Loading	
Pumps	Mine Cars and Wheels
Sheaves	
Oil Spray Systems	Retarders
Tubing Blowers	Rerailers



Maximum Capacity Mine Car

THE BROWN-FAYRO COMPANY

940 ASH STREET . . . . JOHNSTOWN, PA.

neer will take pride in having a hoist as carefully kept as the station itself, thus promoting the long life and efficiency of the winding equipment. Had the drums been made 10 ft. in diameter instead of 8 ft. the life span of the equipment would have been still further lengthened. If thus designed, the winding unit would follow more closely the demand that the diameter of the drum should be 80 times as large as the diameter of the rope. To fill that requirement closely, the drum would need to have a diameter of 11 ft.

Installing the hoist was no mean achievement, according to Mr. Stewart. All the sections had to be lowered down a shaft 700 ft. deep to the pit bottom and hauled along the headings in a specially low-hung car. A 10-ton crane had to be installed in the hoist room to handle the sections. The unit with its electrical equipment occupies 2,200 sq.ft. The hoistroom is in the submarine section of the mine where the overburden is about 315 ft. and is located in the part previously mined by room-and-pillar operations. This room could not have been constructed with safety before the concrete walls and steel roof were started; in consequence, each section had to be made secure before the excavation of another section was attempted. Sidewalls are of reinforced concrete 18 to 21 in. thick, and the roof beams are 6x12-in. steel sections spaced at 12-in. centers.

For a while, the hoist will have a range twice as long as is needed, and this will be wasteful, but in the end its full capacity will be utilized and it will be less expensive in first cost and operation than a number of small hoists. Belt conveyors from face to surface would be the ideal solution, in Mr. Stewart's opinion, each section being driven by an electric motor.

Unlooped Ventilation

One-way ventilation usually is regarded as the conversion of a pair of headings (one an intake, one a return) into two intakes, one or both of which reach at the far end an opening such as drift, slope or shaft leading directly to the surface. In a Nova Scotia mine, two rock tunnels, one an intake, the other a return, were driven from the Phelan seam, each 5,335 ft. long and rising on a gradient of 1 percent. They thus reached the Harbour seam, which is 431 ft. higher, for the seams dip heavily as they leave the shore. These tunnels were described in *Coal Age*, October, 1939, p. 46.

The upper mine is known as Dominion No. 20 and the lower as Dominion No. 2. When the upper mine began to demand a large volume of air it was decided that a big shaft should be raised from No. 2 to No. 20 to carry 250,000 c.f.m. of air after contamination to the return and upcast shafts of No. 2 colliery, thus making it possible to establish one-way ventilation in the two rock tunnels, both tunnels being made intakes. The size of the shaft is 12x20 ft., stated John J. McIntyre, Dominion Coal Co., reading an article written by Joseph Kalbhenn, assistant mining engineer of that company.

While being raised the shaft had three timbered compartments distributed across one end, one for the ventilation tubes and compressed-air and water pipelines, a center one to serve as a cageway for hoisting men and materials and the third for a ladderway. The rest of the shaft was kept full of rock up to the operating level.

Work started Oct. 1, 1942, and was completed July 9, 1943. A pack of 6x6x34-in. hardwood blocks was constructed in the lower bed, 7 ft. high, from floor to roof and tightly wedged. This pack covered an area of 9x14 ft., and the area therefore was somewhat smaller than that of the shaft opening (12x20 ft.). This left a 6-ft. space at the back for the three timbered compartments to pass upward into the shaft and a 3-ft. space on one side for a passageway from front to rear of shaft. The portion of the shaft in which the three timbered compartments were lying was shot down across the full width to a height of 20 ft.

From the top of this a slope the full width of the shaft was driven down to connect the front and rear of the shaft. After completion, this slope left below it a body of rock shaped roughly like a right-angle triangle, the base of which rested on the hardwood pack, the vertical leg forming one wall of the three timbered compartments and the sloping side forming the incline down which the rock was to slide later into the mine cars. An 8x10-in. Rand double-cylinder air hoist dropped the trips of empty cars to the loading point, spotted them under the chute and hauled them up an incline for transfer to the rooms in which the rock was to be stowed. Men and material were handled in the shaft by a 7x6-in. Rand air hoist set on a concrete base. A 6x9 flexible wire rope of $\frac{5}{8}$-in. diameter raised the cage while a No. 7 Sirocco blower driven by a 7½-hp. air turbine provided ventilation, the air being carried to the shaft by a sheet-metal duct of 20-in. diameter and carried up the airway compartment by a canvas tubing of equal size. The fan was shut down during actual blast to protect tubing.

The day force which took care of the rock after mining consisted of five rock stowers, two drivers, and one each of engine runners, chainmen, chute tenders, road makers and shiftmen. The forces which worked three shifts each consisted of two drillers, two helpers, one shotfirer and one hoistman. Thus 30 men were employed in every 24-hour period under the supervision of a foreman. Average advance per round was 7 ft. Rock was drilled with two Ingersoll-Rand R-48 stopehamers, driven by air from a 4-in. line laid to the foot of the shaft with a 2-in. pipe to conduct it to the working face. A 1-in. pipeline up the shaft gave ample water for drilling.

Drill steel used was 1-in. hollow hexagon in 1½-, 3-, 4½-, 6-, 7½- and 8½-ft. lengths. Starter steel had a gage of 2 in., and the diameter of each steel used was ⅛ in. less than that of its predecessor. From four to ten sets of steel (24 to 40 steels) were used to drill a round, the variation depending on the hardness of the rock. A 6-point Rose bit was used with good results, especially in soft shales, though in soft rock the stopehamers fed too fast and tended to stick, but by alternately releasing and applying air pressure to the feed leg the drill developed a quick dancing motion which kept the steel free.

The V-cut was always drilled and blasted before the rest of the shaft material, and the square-up, or rib, holes were all shot together. Polar Forcite 40-percent gelatin was used for all blasting, fired by No. 8 delay electric detonators with delays running from 0 to 7. During the blast, the fan was stopped, but started immediately afterward. In raising the shaft only two lost-time accidents, involving a loss of 31 man-shifts, occurred.

About twice as much explosive per ton of rock was used in the tunnel as in the shaft, partly because the rock was being merely blown down in the latter case and acted always in the most favorable manner.

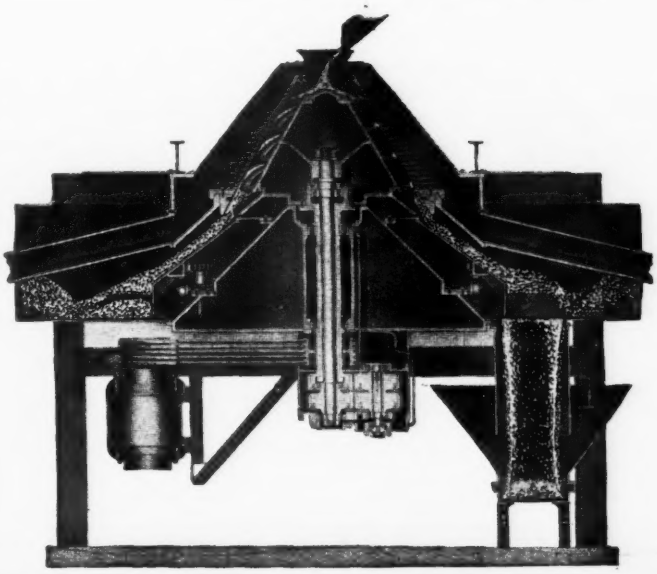
Honoring those who risked their lives for others at the New Waterford mine fire: front row—Caesar Lalo, Augustus McNeil, Joseph Campbell, Paul Aucoin; rear row—A. A. MacKay, president, Canadian Institute of Mining and Metallurgy; Mrs. Currie, who presented the medals; L. D. Currie, Minister of Mines of Nova Scotia, and A. E. Cameron, Deputy Minister and president, Nova Scotia Mining Institute.

"C-M-I" Continuous Centrifugal DRYER

MORE COAL Dewatered

. . . little or none of the . . . finer sizes lost

Takes little room—easy to install—increases output—conserves materials, power, and time. The coal delivered by this unit does not clog cars, spouts, etc., nor does it become a frozen mass in transit or when stored.



★ Increase your output by making the fine sizes usable. The "C-M-I" Dryer can be arranged to easily accomplish this objective—also thru another arrangement you can dispose of the finely divided clay and ash particles with the effluent.

The "C-M-I" Dryer is invaluable as an immediate aid in getting more coal to market by quickly conditioning the coal for shipment or storage.

The coal produced is dried to a non-freezing moisture content.

CENTRIFUGAL AND MECHANICAL INDUSTRIES, INC.

SECOND AND PRESIDENT STREETS ST. LOUIS 18, MO.

"PASS THE AMMUNITION"

NATIONAL

An Industrial Ammunition

Made in an

AMERICAN PLANT

with

AMERICAN MATERIALS

by

AMERICAN WORKMAN

for

AMERICAN MINERS

NOT LIVING ON OUR REPUTATION
BUT BUILDING IT

NATIONAL POWDER COMPANY

ELDRED (McKean County) PENNA.

Manufacturers of High Explosives
for all Industrial Purposes

at right angles to the bedding. In the tunnels, 1.6 lb. of explosive was expended per ton of rock and in the shaft only 0.8 lb., said Garfield G. Bowser, Canadian Industries, Ltd. The explosives used in the tunnel ran from 2.86 to 3.46 lb. per cubic yard, or an average of 1.58 lb. per ton.

The stone chute worked satisfactorily, declared W. F. Metcalfe in a communication read by Dr. Gray. It gave no trouble, despite the large rocks which came to the loading chute, some so large that they had to be blasted. Though the roof was bad, it was not loose until it was scaled, and then it would all at once begin to crack and burst and fall all around as if there were more pressure on the strata than before shooting, a condition to which the men took some time to accustom themselves.

In the entire operation only two shots missed. Much credit is due to the men who loaded and connected the holes and saw all connections were cleaned and well fastened. Only once did the men have to return up the shaft before shooting, and then they found a broken connection. In connecting, all loose wires were cut and connections made as tight as possible, placing them close to the roof, so that if a small piece of rock should fall on the firing line, it would slip off and no connection would be broken. When the face had been blasted, the fan was speeded, so that any rock in falling would not rip off the supporting rings and damage the tubing.

Drillers Kept Watch

No shift bosses were employed in any of the three 8-hour shifts, but the two drillers on each shift were responsible men, and they were instructed before going to work. An old piece of 4x6-in. spruce, that appeared good, broke, letting down a driller and his helper with the drill, but the muck was only 6 ft. below the staging, and the fall accordingly not severe. In another shaft now completed and started in January of this year, no one lost even an hour by reason of accident.

Fifteen percent of the power generated by the Dominion Coal Co., asserted M. W. Booth, was utilized by the pumps, about 2½ tons of water being pumped for every ton of coal mined. To get efficiency from centrifugal pumps, they must be fitted to the work they have to perform, whereas a reciprocating pump will work well anywhere. When the head is low, use a centrifugal. Trouble has been experienced with centrifugals, due to the presence of air in the suction pipe. In many cases the pumps are operated submerged.

Coal production in Nova Scotia, stated A. E. Cameron, Deputy Minister of Mines, has reached its maximum. In 1913 it was 8,000,000 tons and in 1941 it was 7,700,000 tons and has never since been higher. The easily accessible and therefore reasonably inexpensive coal has all been extracted. High efficiency is the only hope for the industry. Tons per man-day must increase; otherwise only continuing and increased subsidies and other assistance can save the day. All mines die and, to keep operations going, Cape Breton's mines must be extended beyond the present submarine limits or operations must be conducted in lower-grade coals. More money must be expended in investigation and research and in recovering coal left in existing workings or beyond levels of abandoned operations, but this can be done only if research proves the extent and value of the coal in each case. If these problems can be solved, there is enough coal for another 100 years.

A large area, said N. T. Avard, Maritime Coal, Railway & Power Co., has been ruined in the Joggins region by bootlegging, except in the Queen bed, which holds definite possibilities of approach through the outcrop. In a square mile, there are 74 bootleg holes. Mr. Cameron had asserted, he said, that 2¼ tons per man-day was the dividing line for profitable operation, but the production in Nova Scotia failed to fill that requirement.

Nova Scotia has not been slow to keep up with modern development, said Dr. Gray. The byproduct coke oven plant of Dosco was the first in Canada and one of the very first outside Europe, and it is still the only plant of its size using Canadian coal. It cokes 750,000 tons of Cape Breton coal annually, and its range of byproducts is equal to that of any purely coal-and-steel enterprise in Canada.

A communication from T. L. McCall, general manager, Dominion Coal Co., said that some of the workings were over 3 miles from the nearest point of land and that other workings were 2,000 ft. deep below the ocean. In 1913, the company had 17 collieries in operation and now has nine yielding practically the same daily output. Coal should be sized as near the distant market as possible though it should be screened locally for the nearby market.

Mine workers' absenteeism cannot be blamed for the operator's troubles, declared D. G. Burchell, Bras d'Or Coal Co. In Florence colliery absenteeism of day workers in November, 1905, was 17 percent and of tonnage miners 20 percent. Present-day figures probably do not exceed those of that date, but with more men on the company list in 1905 than were needed, this created no difficulty. More and more mechanization is the cure.

With 1 percent of the coal loaded by machine in Nova Scotia and 42 percent in the United States, the cure for the low tonnage is self-evident. Cars should be larger and belts should be provided in the slopes in place of ropes. Goodyear has introduced a steel-cord conveyor that will permit of the introduction of a single unit six miles long.

In his presidential address, C. S. Wilson, chief engineer, Dominion Coal Co., declared that cost of coal mining in Nova Scotia, according to the Department of Mines, exceeds the selling price. The power used in the Dosco coal mines has now mounted to 25.4 kw.-hr. per ton. Costs have been increased by the fires at No. 12 and Acadia. Other speakers were J. P. Messervey, mining engineer, Province of Nova Scotia, who discussed mining activities, and Prof. G. V. Douglas, who urged that as less tonnage was being derived from metal mines of recent discovery, prospecting should be encouraged.

Institute's Awards

An award of the Nova Scotia Mining Institute's scholarship to William Macrae, the son of a coal miner, was announced. Mining engineers of standing have agreed to advise students regarding their college career should they so desire.

Medals for bravery were awarded, on behalf of the Canadian Institute of Mining and Metallurgy, to Caesar Lalo, Augustus McNeil, Joseph Campbell and Paul Aucoin for their services in warning and rescuing men and fighting a fire in No. 12 Mine, New Waterford, May 25, 1943.

"You sure this isn't your order of coal?"

Low-Volatile Briquet Passes Test Stage

A low-volatile, smokeless-type fuel briquet has proved its value in recent experiments conducted by the city of Nashville, Tenn., according to Lynn C. Peal, city smoke and boiler inspector, in his annual report. He said the Tennessee Products Corp. proposed to erect a plant at Cookeville, Tenn., to process 10 tons of the briquets per hour at a cost to the consumer of $8 per ton. The briquets would be made from the dust washed from coal accumulated during past years. The corporation is said to have 350,000 tons of the dust now available.

"It is a good fuel, in my opinion," said Mr. Peal, "and we have assured the Tennessee Products Corp. that we will do all we can to encourage its use." The inspector also reported that numerous stokers had been ordered for downtown buildings and that a number of apartment houses also would install them—as a step toward smoke elimination.

•

Two Named to Probe Anthracite Resources

Two Pennsylvania government department heads have been named by the U. S. Bureau of Mines to an advisory committee in connection with a projected special investigation of anthracite resources aimed at conserving them for national defense. Secretary of Mines Richard Maize and James A. Kell, Secretary of Forests and Waters, were named by R. R. Sayers, director of the Bureau. The committee also will include representatives of operators and the United Mine Workers of America.

Authorized by Congress in 1942, the inquiry will include both laboratory and field research, with John W. Buch directing an investigation of mining methods and Simon H. Ash, flood prevention. Secretary Maize, who said that the inquiry is aimed at conserving coal resources in the postwar period as well as at present, stated further subjects to be investigated also include preparation and utilization of anthracite, safety, health and sanitation in mining operations and other problems of the industry.

•

New Smokeless Stove Shown by B. C. I.

A new smokeless stove—that burns soft coal and consumes its own smoke—for post-war home heating was given a preview July 14 by the Bituminous Coal Institute in the Music Room of the Hotel Biltmore, New York City. Costing less than $100, it is designed also for economical operation by reducing the quantity of fuel required by one-third. It will hold a fire for nearly a week and provide heat for about 50 hours on one stoking. It has storage space for 100 lb. of coal; 75 lb. will hold a fire for 72 hours.

Developed by Bituminous Coal Research, Inc., cooperating with 27 stove manufacturers, the new home-tested heating unit is said to embody radical and revolutionary principles that are expected to have far-reaching effects in the more than 17,000,000 American homes—569,000 in metropolitan New York—heated by stoves.

Other features of the exhibit included a model of a cook stove employing the same principles of combustion, now undergoing tests; also a Warm Morning stove of the Locke Stove Co., a Pocahontas winter air-conditioning unit and an overfire air jet system for use in locomotives, which permits operation without smoke.

•

Mining Engineers Elect Officers

Pennsylvania Anthracite Section of the American Institute of Mining and Metallurgical Engineers held its annual meeting July 15 at the Valley Country Club, Hazleton, Pa., and elected the following officers: chairman—L. B. Lamont, Pottsville; vice chairman—W. C. M. Butler, Hazleton; secretary-treasurer, Floyd S. Sanders, Wilkes-Barre; executive committee, one year—Edward Griffith, Wilkes-Barre; Cadwallader Evans Jr., Scranton; H. D. Kynor, Hazleton; D. C. Helms, Lansford; W. H. Lesser, Scranton; executive committee, two years—C. A. Garner, Jeddo; Harry Otto, Scranton; R. Y. Williams, Pottsville; Robert L. Klotz, Hazleton; H. B. Stockett, Pottsville; executive committee, three years—Evan Evans, Lansford; Ralph Lambert, Dunmore; Wilmot C. Jones, Jeddo; William B. Wells, Pottsville; William B. Geise, Nanticoke.

•

Mine Fatality Rates Dip Below Last Year's

Accidents at coal mines of the United States caused the deaths of 77 bituminous and 14 anthracite miners in May last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With an output of 55,220,000 net tons, the accident death rate among bituminous miners in May last was 1.39 per million tons, compared with 1.29 in the preceding month and 2.44 in May, 1943.

The anthracite fatality rate from accidents in May last was 2.40, based on production of 5,837,000 tons, against 0.77 in the preceding month and 4.04 in the fifth month of last year.

For the two industries combined, the accident fatality rate in May last was 1.49, compared with 1.24 in the preceding month and 2.60 in May a year earlier.

Fatalities during May last, by causes and states, as well as comparable rates for 1943 and 1944, were as follows:

UNITED STATES COAL-MINE FATALITIES IN MAY 1944, BY CAUSES AND STATES

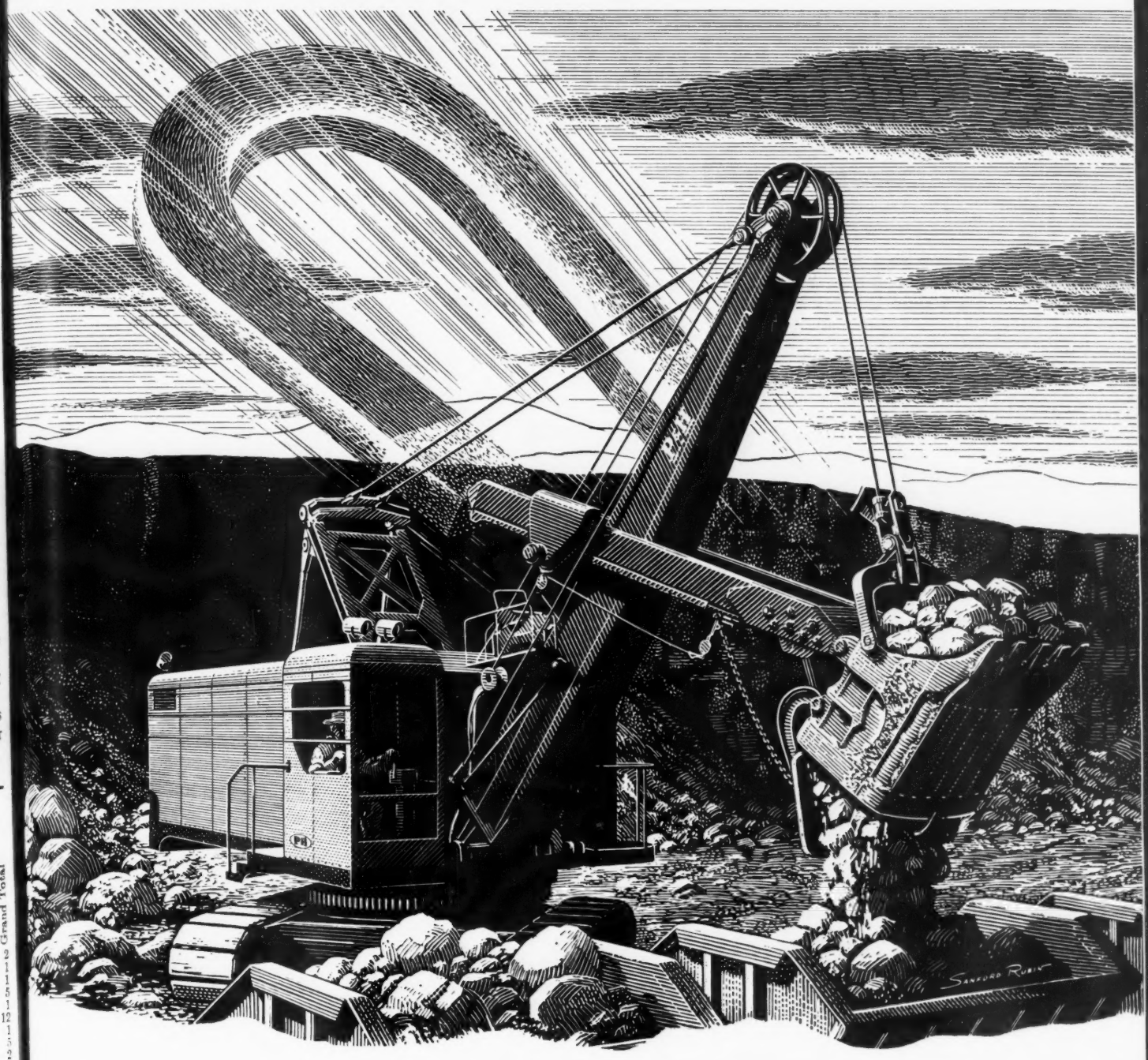
State	Underground: Falls of roof	Falls of face	Haulage	Gas or dust Explosions	Electricity	Machinery	Other causes	Total Underground	Shaft	Open-cut	Surface	Grand Total
Alabama	1	..	1	..	..	..	..	2	..	..	..	2
Arkansas	..	..	1	..	..	..	..	1	..	..	..	1
Colorado	..	..	1	..	..	..	..	1	..	..	..	1
Illinois	4	..	1	..	..	..	..	5	..	..	..	5
Indiana	..	..	..	..	..	1	..	1	..	..	..	1
Kentucky	9	..	..	..	1	1	..	11	..	..	1	12
Montana	1	..	..	..	..	..	..	1	..	..	..	1
Ohio	4	..	1	..	..	..	..	5	..	..	..	5
Oklahoma	..	..	..	..	1	..	..	1	..	1	..	2
Pennsylvania (bituminous)	5	..	1	..	..	1	2	9	..	..	..	9
Tennessee	2	..	..	..	..	..	..	2	..	..	..	2
Utah	..	..	..	..	..	1	2	3	..	..	..	3
Virginia	..	..	1	..	..	..	..	1	..	..	..	1
West Virginia	17	..	8	1	1	3	..	30	..	..	1	31
Wyoming	1	..	..	..	..	..	..	1	..	..	..	1
Total bituminous	44	..	15	1	3	7	4	74	..	1	2	77
Pennsylvania (anthracite)	6	2	1	..	1	..	3	13	1	..	..	14
Grand total	50	2	16	1	4	7	7	87	1	1	2	91

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*

January-May, 1943 and 1944

Cause	Bituminous: Number Killed		Bituminous: Killed per Million Tons		Anthracite: Number Killed		Anthracite: Killed per Million Tons		Total: Number Killed		Total: Killed per Million Tons	
Underground:	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944	1943	1944
Falls of roof and coal	280	220	1.121	0.828	42	38	1.619	1.381	322	258	1.168	0.880
Haulage	108	90	.432	.339	17	10	.655	.363	125	100	.453	.341
Gas or dust explosions:												
Local	17	3	.068	.011	1	1	.039	.036	18	4	.065	.014
Major	96	16	.384	.060	..	..	..	..	96	16	.348	.054
Explosives	16	4	.064	.015	5	8	.192	.291	21	12	.076	.041
Electricity	13	14	.052	.053	..	1	..	.036	13	15	.047	.051
Machinery	11	16	.044	.060	1	..	.039	..	12	16	.044	.054
Shaft	5	2	.020	.008	..	2	..	.073	5	4	.018	.014
Miscellaneous	18	8	.072	.030	9	6	.347	.218	27	14	.098	.048
Stripping or open-cut	16	9	.064	.034	3	2	.116	.073	19	11	.069	.038
Surface	28	17	.112	.064	9	6	.347	.218	37	23	.134	.078
Total	608	399	2.433	1.502	87	74	3.354	2.689	695	473	2.520	1.613

* All figures subject to revision.



ow We Harnessed a Magnet to Eliminate Wear

Where there is no mechanical contact between moving parts, no wear can take place. This is the principle which P&H uses to transmit power for hoisting the dipper of the new P&H Electric Shovel. . . . The *Magnetorque Drive* transmits torque by electro-magnetic forces rather than by mechanical contact. Designed specifically for Electric Shovel operation, it eliminates motor commutation problems, sliding gears, mechanical clutches and other complicated mechanisms. Reversing the hoist motor is no longer necessary. Hoisting is completely independent of all other operations.

The *Magnetorque Drive* is typical of the advanced engineering and simplicity embodied in every detail of the new P&H Electric Shovel. Write for full information about the new P&H Electric Shovels.

P&H ELECTRIC SHOVELS

4540 W. NATIONAL AVE.
MILWAUKEE 14, WISCONSIN

HARNISCHFEGER CORPORATION

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · HOISTS · WELDING ELECTRODES · MOTORS

E GREATEST FORWARD STEP EVER MADE IN ELECTRIC SHOVEL DEVELOPMENT

What to Look for in INSULATING TAPES

Check these facts when selecting insulating tape:

A. The base cloth must: (1) have ample mechanical strength; (2) be chemically inert: (3) contain minimum sizing to permit thorough penetration by the insulating varnish and prevent weakening of the fiber in service.

B. The varnish must: (1) be neutral in relation to the cloth; (2) impart maximum dielectric strength, flexibility and resistance to heat, oil, water or other damaging agents against which the particular tape is to give protection.

C. A ready source of supply for all types of insulating tapes must be available. Your local G-E distributor handles a complete line of tapes, as well as all other insulating materials, and can furnish detailed data and catalog on request. Or send for catalog to Section M844-10, Resin and Insulation Materials Division, General Electric Company, Schenectady, N. Y.

There is a G-E Insulating Tape for every need.

GENERAL ELECTRIC

Hear the General Electric radio programs: "The G-E All Girl Orchestra" Sunday 10 P.M. EWT, NBC. "The World Today" news every weekday 6:45 P.M. EWT, CBS.

P. & R. Develops At Locust Gap

A new third level is being developed by the Philadelphia & Reading Coal & Iron Co. in No. 2 Summit slope at Locust Gap colliery, Locust Gap, Pa. The project involves sinking a development slope and raising a rock slope together with installation of a 1,350-cu.ft. electrically operated air compressor.

The boiler plant at the company's Mahanoy City colliery is being rehabilitated by installation of new boilers. To make possible the resumption of mining at the Pine Knot colliery, a 600-hp. electric hoist has been installed in the No. 2 shaft. A combined drainage and haulage tunnel, now advancing, will connect Pine Knot with the Oak Hill colliery, where the coal will be prepared in an existing breaker.

•

Slash in Funds Cuts Synthetic-Fuel Study

Projected experimental work in developing synthetic fuels by the U. S. Bureau of Mines is to be revised and sharply curtailed because of a cut in the Interior Department's appropriations allowance for the scheme as passed in the fourth week in June by the House and Senate. An appropriation of $5,000,000 was passed for the coming fiscal year, representing a reduction of $3,000,000 from the original recommendation.

Also eliminated was a provision allowing the Bureau to make contractual obligations up to $30,000,000, the authorized limit set in the synthetic fuels bill. This, in effect, puts the project on a one-year basis, making it impossible for the Bureau to schedule a long-term project of experimentation and development.

•

Clerical Union Bid Rejected by NLB

The National Labor Relations Board has dismissed the petition of the United Mine Workers' District 50 United Clerical, Technical and Supervisory Employees' Union for certification as the collective bargaining agency for technical and clerical workers for the Rochester & Pittsburgh Coal Co. The company had refused a request of the union on Nov. 12, 1943, for formal recognition as bargaining representative of such employees working at the company's mines and other properties.

After reciting various features of the case the Commission said: "The Maryland Drydock and Soss cases, taken together, clearly condemn the representation of ordinary employees and supervisory employees by the same labor organization, both because of the inherent threat to the freedom of choice by ordinary employees and because of the irreconcilable and conflicting positions in which such affiliations would place supervisors. The requirement that a labor organization be free of managerial control and fully competent to represent all employees in the proposed bargaining unit is a fundamental one. . . .

Homocord

construction in CONVEYOR BELTS -another MANHATTAN development- war-proved for your post-war use

Condor PRODUCTS

Conveyor and Elevator Belt • Compensated Belt • Transmission Belt • V-Belt • Air Hose • Contractors Hose • Fire Hose • Hydraulic Hose • Oil and Gasoline Hose • Sand Blast Hose • Steam Hose • Suction Hose • Water Hose • Chute Lining • Launder Lining • Industrial Brake Blocks and Lining • Molded Rubber Goods • Rubber Lined Tanks • Rubber Covered Rolls • Abrasive Wheels • Bowling Balls.

Here is a totally different type of Strength Member construction — developed in time to speed war production and now improved with FLEXLASTICS* for post-war use.

Pre-war installations have been delivering high tonnage on a steady basis that is adding to MANHATTAN'S already distinguished achievements in conveyor belt service.

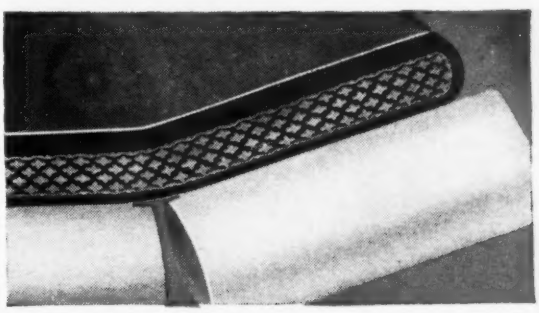
Homocord construction has been invented and perfected by MANHATTAN engineers particularly and only for conveyor belt use, and it is not designed for use in any other products. It is the first and only conveyor belt possessing the virtues of a cord belt, but with the drawbar strength and resistance to fatigue to hold metal fasteners. It marks a distinct milestone in conveyor belt progress.

Longitudinal Homocords are grouped to give great tension strength and tied together with cross Homocords which allow exceptional troughing for full loading of the belt, plus the strength to permit use of fasteners.

These component Strength Members are sealed-in to make a homogeneous, pliable belt which flexes easily around end pulleys. The Homocords, embedded in moisture-proof FLEXLASTICS* and mildew-proofed as additional protection, have a flexible, resilient, rolling contact with each other to provide cushioned resistance for heaviest feed impact.

These are significant advantages that will help you meet tomorrow's needs. They are worth investigating now.

Homocord Conveyor handling unusually large pieces of limestone.



Detail of Homocord Strength Member construction. Note how open fabric structure permits rubber to penetrate and unite all parts into a homogeneous whole.

ARMY NAVY

*The term FLEXLASTICS is an exclusive MANHATTAN trade mark. Only MANHATTAN can make FLEXLASTICS.

KEEP AHEAD WITH MANHATTAN

THE MANHATTAN RUBBER MANUFACTURING DIVISION
OF RAYBESTOS-MANHATTAN, INC.
EXECUTIVE OFFICES PASSAIC, NEW JERSEY

SCHRAMM AIR COMPRESSOR...doing its job and keeping well ahead of the loading shovel

"Look—An air compressor doing its job—and keeping out of the way of the loading shovel! *That's* why I like Schramm."

A mine superintendent was pointing at his Schramm Air Compressor. What he saw is depicted in the illustration below.

"Schramm works fast—and doesn't tie up its part of the job."

That's a point worth considering. Be sure your next compressor can do the job fast . . . is lightweight . . . easy to tow about . . . and rugged enough to do any job.

Schramm compressors—often called the "versatile" compressor because they do so many jobs around the mine—simplify your demands for air where you want it. Write today for full details in Bulletin COM—44.

SCHRAMM INC. THE COMPRESSOR PEOPLE WEST CHESTER PENNSYLVANIA

Reading Coal Plan Gets Court Approval

After seven years of litigation a final decree confirming a plan, amended five times, for reorganizing the Philadelphia & Reading Coal & Iron Co. was signed July 10 by Judge William H. Kirkpatrick of the United States District Court at Philadelphia. By the first of next year the company expects to be operating with its original capital cut from $61,527,700 to $11,346,455.

•

Roads to Switch To Diesel Power

The program for switching to exclusive use of diesels for motive power by the New York, Ontario & Western Ry., approved by Federal Judge Murray Hulbert on the petition of Frederic E. Lyford, trustee of the railroad, is expected to result in annual savings of $1,500,000 on the basis of present business, according to Mr. Lyford. Substitution of diesel-electric for present steam locomotives will require an expenditure of $6,700,000. A projected income account for a year based on 1943 revenues and on estimated cost of operation under complete dieselization, with wages, fuel and other costs adjusted to 1944 levels, said Mr. Lyford, shows a net income of $548,212 for the company. With this estimate in view, Mr. Lyford expressed the hope that a basis for reorganization of the company could be formulated.

The trustee of the New York, Susquehanna & Western R.R. has been authorized by Judge Smith of the U. S. District Court at New York to purchase eight deisel locomotives. This additional power will enable the trustees to completely dieselize passenger operation and, with freight traffic at pre-war level, will eliminate steam locomotives altogether.

•

Powhatan Mine Fire Traps 66 men

Hope vanished July 9 for 66 miners imprisoned by fire which broke out July 5 in Powhatan mine of the Powhatan Mining Co., near Bellaire, Ohio. When drillers holed through a 9-in. opening where the men were trapped 410 ft. below ground their calls were answered only by echoes. A 3-in. hole drilled about 1,200 ft. away toward a section in the mine where it was thought the trapped men might have erected a barricade against smoke and fumes from the fire was equally fruitless. Work also was begun on a slope entry into the mine to recover the bodies; this, it was said, might take several weeks.

Expressing its sorrow over the disaster, the Powhatan Mining Co., in a statement July 14 declared that "the first rule of this company, since the new management took charge two years ago, has been to place the safety of its miners above every other consideration, regardless of cost. As a result of rigid adherence to this policy, Powhatan mine was adjudged the safest

FOR GIVING FORCE TO A SLOGAN

From president to porter, everyone at Thermoid knows that continued prestige for Thermoid Products demands more than just a slogan . . . that Thermoid's leadership and growth depend solely upon the quantity and quality of effort contributed by each and every employee.

This concept of service is fostered by special honors awarded regularly for outstanding work. The most coveted of these awards is the "Achievement Medal" pictured here and conferred each year on the three men or women who most nearly reach "approximate human perfection" in performance of their duties.

By emphasizing the fact that an employee's own welfare is linked directly with the common good of company, fellow workers and customers, Thermoid is able to supply products and render services that give force to its slogan: "It's good business to do business with Thermoid".

Thermoid Rubber

DIVISION OF THERMOID COMPANY

TRENTON, NEW JERSEY

THE THERMOID LINE INCLUDES: Transmission Belting • F.H.P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Sheet Packings • Industrial Brake Linings and Friction Products • Molded Hard Rubber and Plastic Products.

It's Good Business to do Business with Thermoid

Don't put it off 'til tomorrow— BUY MORE WAR BONDS TODAY !

WATER BOY
1944 Model

20 FEET OR HUNDREDS OF MILES . . . YOU CAN DEPEND ON NAYLOR LIGHT-WEIGHT PIPE TO DELIVER

Whether your job calls for water or de-watering . . . high pressure or low . . . it will pay you to check the advantages of Naylor Light-weight Pipe.

This pipe with the exclusive Lockseam Spiralweld structure provides dependable performance not found in any other light-weight pipe. Greater strength that enables Naylor to handle jobs normally requiring heavier-wall pipe. Leaktightness. Safety —through its "continuous expansion joint" construction that absorbs shock loads, stresses and strains.

Along with these benefits, Naylor gives you greater speed of assembly, cuts work, lowers maintenance and effects other economies right down the line.

Sizes from 4" to 30" in diameter—thickness from 14 to 8 gauge. All types of fittings, connections and fabrication.

Use NAYLOR PIPE for

Dredging • Hydraulic Sluicing • De-Watering • Ventilating • Exhaust and Intake • Gas Gathering • Pulp Lines • Vacuum Lines and other high or low pressure lines.

Naylor

NAYLOR PIPE COMPANY

1248 EAST 92nd STREET, CHICAGO 19, ILLINOIS

NEW YORK OFFICE: 350 MADISON AVENUE, NEW YORK 17, N. Y.

mine in the State of Ohio in 1943, winning the citation of the Ohio Department of Industrial Relations. . . . The chief federal mining inspector for Ohio, testifying at the public hearing at St. Clairsville following the disaster, declared that the Powhatan mine was one of the best equipped coal mines in Ohio, if not in the United States, for fighting fires of this kind."

•

To Help Mechanize British Mines

At the request of Secretary of the Interior Harold L. Ickes, Andrew B. Crichton, Jr. has been detached from service as a lieutenant (j.g.) in the Navy and has been commissioned by the British Ministry of Fuel and Power for one year's service as a supervisor in the installation of mining machinery and operation of British mines. Lieut. Crichton supervised the installation four years ago of mechanical equipment at the Beaverdale operation of the Johnstown (Pa.) Coal & Coke Co., of which his father is president. He is one of two supervisors and 20 demonstrators who will undertake the British assignment.

•

Strip Mining Spurts In Alabama

Wartime emergencies have caused the most extensive strip mining of coal in Alabama history, says a spokesman of the Alabama Mining Institute. Republic Steel, one of the companies recently added to the list of strip-pit operators, is beginning a stripping operation now which "should yield 400 to 500 tons a day," a company spokesman says. DeBardeleben Coal Corp. is now getting 800 tons a day in strip pits at Patton and Hill, with 500 tons a day output expected from one to be put into production Aug. 1 at Empire.

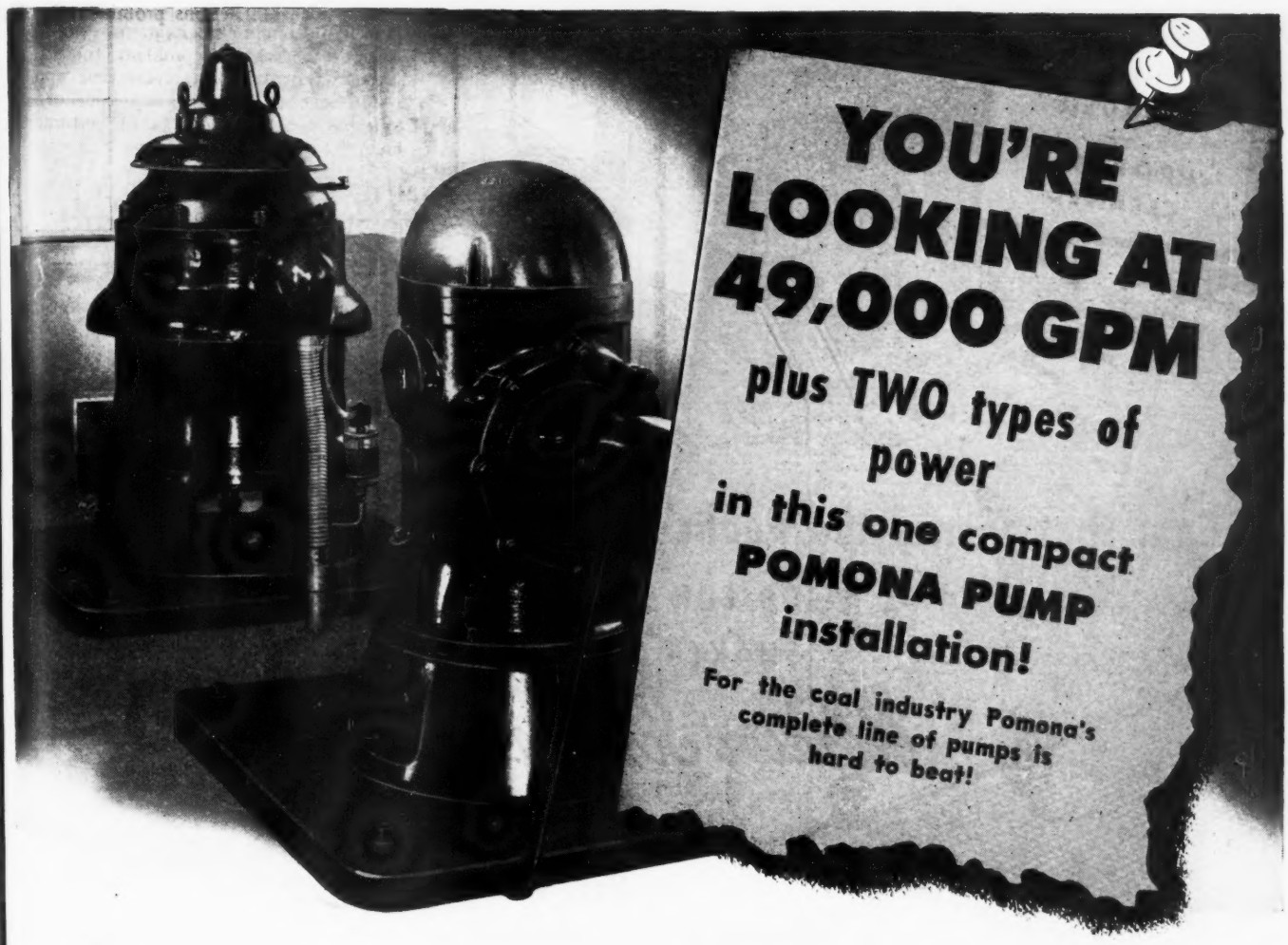
Birmingham district companies now engaged in strip mining include Brookside-Pratt, Galloway Coal Co., Mammoth Coal Co., Marigold Coal Mining Co., DeBardeleben Coal Corp., Shuff Coal Mining Co., William Dredging Co., Alabama Power Co., Moss & McCormick, Stith Coal Co., Republic Steel, Harvey Davidson Co. and L. M. Moore Co.

•

To Study Roof Falls At Lehigh University

Underground accidents in anthracite mines occurring because of falls of roof and coal at the working face have prompted the General Reinsurance Corp. to set up a research program at Lehigh University, Bethlehem, Pa., in which the Anthracite Institute is cooperating and lending its aid. The program contemplates a study of mine-roof conditions with the aim of developing equipment to warn mine officials and miners of a dangerous roof condition that requires attention.

A preliminary study has been made of recently published articles on mine-roof conditions and a reference bibliography built up. Also personal interviews have



YOU'RE LOOKING AT 49,000 GPM

plus TWO types of power in this one compact POMONA PUMP installation!

For the coal industry Pomona's complete line of pumps is hard to beat!

HERE'S a pumping installation where a number of important factors had to be considered in selecting the equipment. Provision had to be made not only for moving a BIG quantity of water in a small space, *but with absolute dependability in any emergency.* So the first decision was what type of pumps were the most compact, efficient and dependable for the job? . . . and the second, what type of power to use?

It is significant that to meet these rigid requirements the decision was to install 100% Pomona equipment.

And to assure positive operation at all times, it was decided to drive the Pomonas with two types of power—mechanical and electrical. The Pomona in the left rear is driven by a 100 hp integral electric motor, while the Pomona in right front is driven by a 105 hp gas engine through a right angle gear head integral with the pump. In addition, two other Pomonas that are part of this installation are also divided between mechanical and electrical drive—*for Pomonas are readily adaptable to either!*

And on the matter of compactness, consider this point. The two Pomonas you see pictured are capable of delivering *over 49 thousand gallons per minute* . . . yet require only a few square feet of floor space in one corner of the building—only a small fraction of the space most other-type pumps of equal performance would require!

This is just one more illustration of the *many* outstanding advantages combined in Pomona Pumps—advantages that are equally important whether your water-moving job is only a few gallons per minute, *or thousands.* Whatever your need, Pomona's complete line of pumps includes one for your job.

And remember these important features! Pomona design puts all the parts requiring service above ground level, practically eliminating maintenance requirements • Finest basic materials,* added to careful workmanship, give the user the rugged construction necessary for longer life • Pomona design initiated the semi-open, adjustable impeller which permits handling pulpy and debris-laden fluids with less wear and risk of clogging. This feature also permits easy adjustment of the pump to flow requirements without wasteful throttling • And overall, Pomonas are designed to cut power costs . . . to save floor space . . to stay on the job longer with less upkeep . . . to deliver more fluid for less money over a longer period!

Capacities of Pomona Pumps cover the complete range up to 300,000 gpm and higher. There's a size to save money on your pumping job. See your nearby Pomona dealer for full details—or write direct!

*Pomona's own metallurgical development—POMOLOY cast iron—makes the Pomona Pump outwear and outlast others. For the story of POMOLOY send today for Bulletin C-8.

POMONA PUMP COMPANY

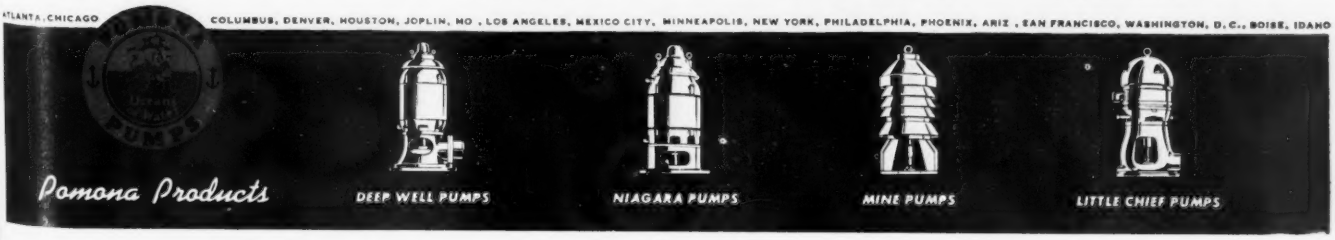
A Division of

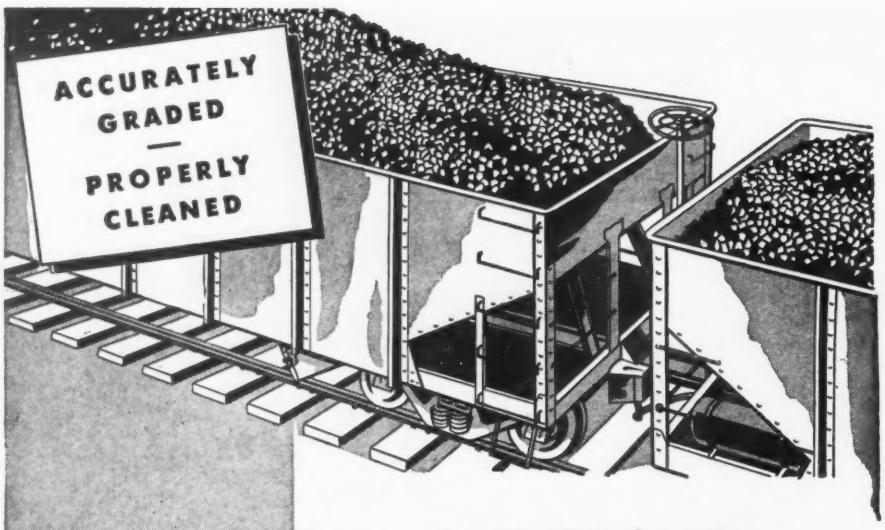
JOSHUA HENDY IRON WORKS

SUNNYVALE, CALIFORNIA

2850 CHIPPEWA ST., ST. LOUIS 18, MISSOURI

ATLANTA, CHICAGO COLUMBUS, DENVER, HOUSTON, JOPLIN, MO., LOS ANGELES, MEXICO CITY, MINNEAPOLIS, NEW YORK, PHILADELPHIA, PHOENIX, ARIZ., SAN FRANCISCO, WASHINGTON, D.C., BOISE, IDAHO



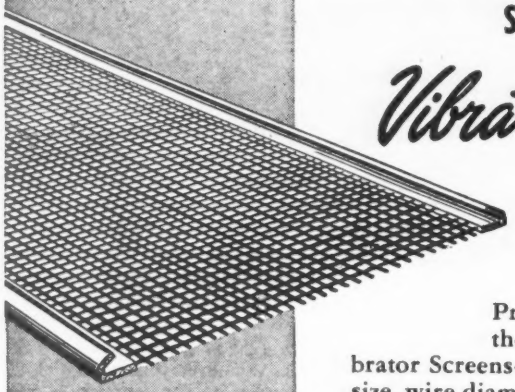


Coal that Merits the Public's Okay

IT'S A JOB FOR ROEBLING

SHAKER OR

Vibrator Screens



Here's Why:

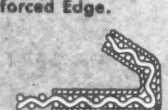
Preparation plants equipped with the *right* Roebling Shaker or Vibrator Screens—tailored to order in any mesh size, wire diameter and in any metal—can produce the *right* kind of coal to meet modern demands...better competitive positions *now*—and later!

They are available in the four turned and metal reinforced types shown to exactly match your needs. Write today for folder on Roebling Woven Wire Fabrics. Then order the screen that will make *your* mine *tops* in preparation performance!

EDGE DETAILS SHOW TYPES AVAILABLE

Type 1: Turned Edge.

Type 2: Metal Reinforced Edge.



Type 3: Double Metal Reinforced Edge. (illustrated above).

Type 4: Square Bar.

Woven Wire Fabrics Division

JOHN A. ROEBLING'S SONS COMPANY

TRENTON 2, NEW JERSEY

Branches and Warehouses in Principal Cities

ROEBLING

PACEMAKER IN WIRE PRODUCTS

WIRE ROPE AND STRAND • FITTINGS • AERIAL WIRE ROPE SYSTEMS • SUSPENSION BRIDGES AND CABLES • COLD ROLLED STRIP • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS • ROUND AND SHAPED WIRE • ELECTRICAL WIRES AND CABLES • WIRE CLOTH AND NETTING • AIRCORD, SWAGED TERMINALS AND ASSEMBLIES

been held with persons prominent in this field of research. Opening up a number of approaches to the problem, these preliminary investigations reveal that apparently none of the proposed lines of attack has ever been tried in the anthracite field.

•

Notes Trend Toward More Diesels

Foreseeing that the diesel will continue to make great progress, William C. Dickerman, chairman of the board, American Locomotive Co., outlines in a recent booklet the work done in the last three years by American railroads with fewer motive power units.

Emphasizing the thin margin on which the railroads are performing excellent service, Mr. Dickerman states that in 1939 there were 43,558 locomotives of all types in this country, whereas, according to a recent compilation, there were 42,139. Serviceable locomotives in reserve have declined from 2,916 to 607 and those awaiting repairs have fallen from 7,920 in 1939 to slightly over 2,000.

Steam locomotives still lead in number, with about 39,429 in use compared with 42,376 in 1939. There were 1,182 electric and diesel locomotives in use five years ago, 2,146 of both types in 1942 and 1,884 diesels alone in the recent compilation. On Jan. 1, 1943, diesels totaled 1,553; electric locomotives now total about 826, or a few more than at the beginning of 1943.

•

Lumber Order Is Revised

Setting forth the procedures governing purchase and delivery of practically all kinds of lumber, the War Production Board's Order L-335 was issued in revised form June 23, effective Aug. 1. It supersedes M-361, M-364, L-290 and M-208. Directions 1 to 5 under the new order, covering West Coast lumber, Western pine, redwood, Southern yellow pine and cypress, respectively, require that, beginning in August, sawmills having more than certain specified capacities must give military orders precedence over all others (except orders rated AAA) up to a stipulated percentage of their anticipated monthly shipments.

Order L-335 classes all serialized mining and smelting operations as "Class II consumers," authorized to purchase lumber without making special application. They may place certified and rated orders within the limits of their over-all quotas for maintenance, repair and operating supplies. Domestic non-serialized mines using less than 50,000 b.ft. of lumber per calendar quarter also are rated as Class II consumers.

L-335 provides a certification to be indorsed or attached to all lumber orders. The Mining Division advises that domestic serialized mines should indicate "AA-1, S-7, P-56" and the prescribed form of certification on all orders for lumber, and domestic non-serialized mines should indicate "AA-5, S-7, P-56" and the certifica-

Our troops inspect a captured Axis tank, looking for booby traps.
INTERNATIONAL NEWS PHOTO

Every battle is a showdown . . . our men, weapons and equipment against the enemy's . . . *wire rope* included. That's why our forces need the best rope they can get . . . *and lots of it.* Below are some of the ways in which *you* can help to send more wire rope over there by making your own rope *last longer* over here:

1. Start with the correct wire rope. If uncertain about size, grade or construction for your specific job, ask us or any distributor.

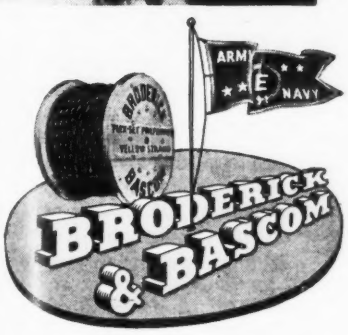
2. Check equipment thoroughly. Repair or replace worn, corrugated or wobbly sheaves. Line up sheaves with each other and with drums, making sure rope does not rub against flanges. Inspect drums for roundness.

3. Install rope carefully. Avoid kinking when unreeling and handling. Never drag rope across concrete or gravel. Wrap rope snugly and evenly on drum, avoiding cross-winding.

4. Break in rope cautiously, gradually increasing speeds and loads. And break in the operator, if inexperienced. Instruct him in the importance of smooth starts and stops . . . reasonable loads . . . frequent examination of rope, sockets, clips and splices.

5. Care for your rope. Clean and lubricate regularly. On many installations rope can be cut off or shifted to distribute wear. Get better acquainted with ropes by sending for our free Hand Book, "Wire Rope for Mining."

One thing more: Use wire rope of known stamina and dependability. *Preformed* Yellow Strand combines flexibility, toughness, elasticity and strength in proper balance. It stays on the job . . . curtails replacements . . . helps you keep manpower and equipment producing . . . for Victory.



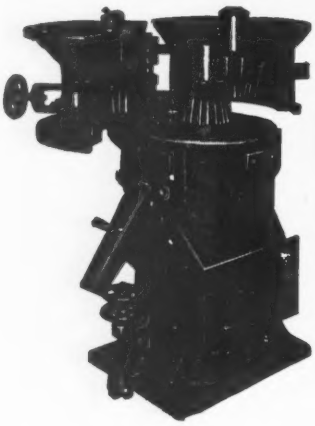
Broderick & Bascom Rope Co., St. Louis

Branches: New York, Chicago, Houston, Portland, Seattle
Factories: St. Louis, Seattle, Peoria

YELLOW STRAND
PREFORMED WIRE ROPE

IT USED TO TAKE 32 OPERATIONS

TO GET THIS SAMPLE!



BUT NOW YOU CAN CRUSH AND SAMPLE

1 TON IN 1 HOUR

WITH THE

STURTEVANT

Automatic

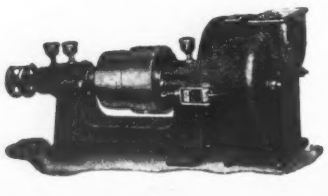
CRUSHER *and* SAMPLER

Times change! It used to be ok to have one or two men devote hours to "sampling" a pile of coal. But today you can get BETTER results — FASTER — delivered to your laboratory by the Sturtevant Equipment shown here. This is MODERN equipment. It meets the modern demand for a better quality coal to meet the increasingly SPECIFIC requirements of modern plants. The FIRST STEP in laboratory-control of coal QUALITY is to get accurate samples quickly and at low cost. This the Sturtevant Coal Crusher and Sampler does without hand labor. Proven by the test of actual service in modern collieries. Can be depended upon as reliable equipment. Simple, rugged, easily adjusted and maintained — and ACCURATE. The ideal combination with this Sampler is the STURTEVANT FINE GRINDER.

HERE IS THE IDEAL COMBINATION TO SPEED LABORATORY CONTROL AND INSURE RESULTS !

STURTEVANT SAMPLE GRINDER

The Sample Grinder is of the "open-door" disc design, producing products as fine as 100 mesh (coarser, if desired) working on dry, friable, soft or moderately hard materials. Handwheel regulates output from 10 to 100 mesh. Will handle hard rock and ore at reduced capacities. Full description and price on request.



Write today for Bulletin illustrating and describing the above equipment in detail. Sturtevant Mill Co. makes a wide line of Grinding, Separating, Elevating, Conveying and Mixing Machines. Write for pocket-size Bulletin covering the whole series.

STURTEVANT MILL CO.

14 HARRISON SQUARE

BOSTON 22, MASS.

tion. No reports of any kind are required.

WPB has issued an official interpretation of Lumber Control Order L-335 as Interpretation 2, dated July 2. By means of 86 questions and answers the more important points are clarified. It is pointed out that mine ties, sawed or hewed, are excluded from the orders' definition of lumber and purchases may be made without restriction under the order.

•

Injunctions Curtail Bootleg Output

As a result of injunctions against bootleg mining operations in Schuylkill County, Pennsylvania, according to R. Y. Williams, engineer for the Anthracite Committee, there has been a complete stoppage of 39 free-lance holes at which 187 miners and 66 truckers were producing about 2,625 tons of commercial coal per week.

•

Compensation For Virginia Strippers

Strip mining of coal, practically nonexistent in Virginia prior to the war, came in for recognition the last week in June, when the State Corporation Commission set rates for surface as well as underground coal mining under the new law providing workmen with compensation for occupational diseases.

The Commission gave approval to a rate of 14c. per $100 of payroll for surface coal mining and 25c. for underground. These rates, which went into effect July 1, are higher than the general average previously fixed by the Commission for various other industries. Recently the Commission approved an increase of 1c. where the present injury rate is 50c. or less and an increase of 2c. where the rate is 51c. or more for various industries. The coal rates were considered separately, since such coverage is not handled under the workmen's compensation inspection rating bureau in Virginia. Only a few companies in Virginia write insurance for coal mining.

Compensation for occupational diseases was provided for by the 1944 Virginia General Assembly in the form of an amendment to the workmen's compensation act providing compensation for injury.

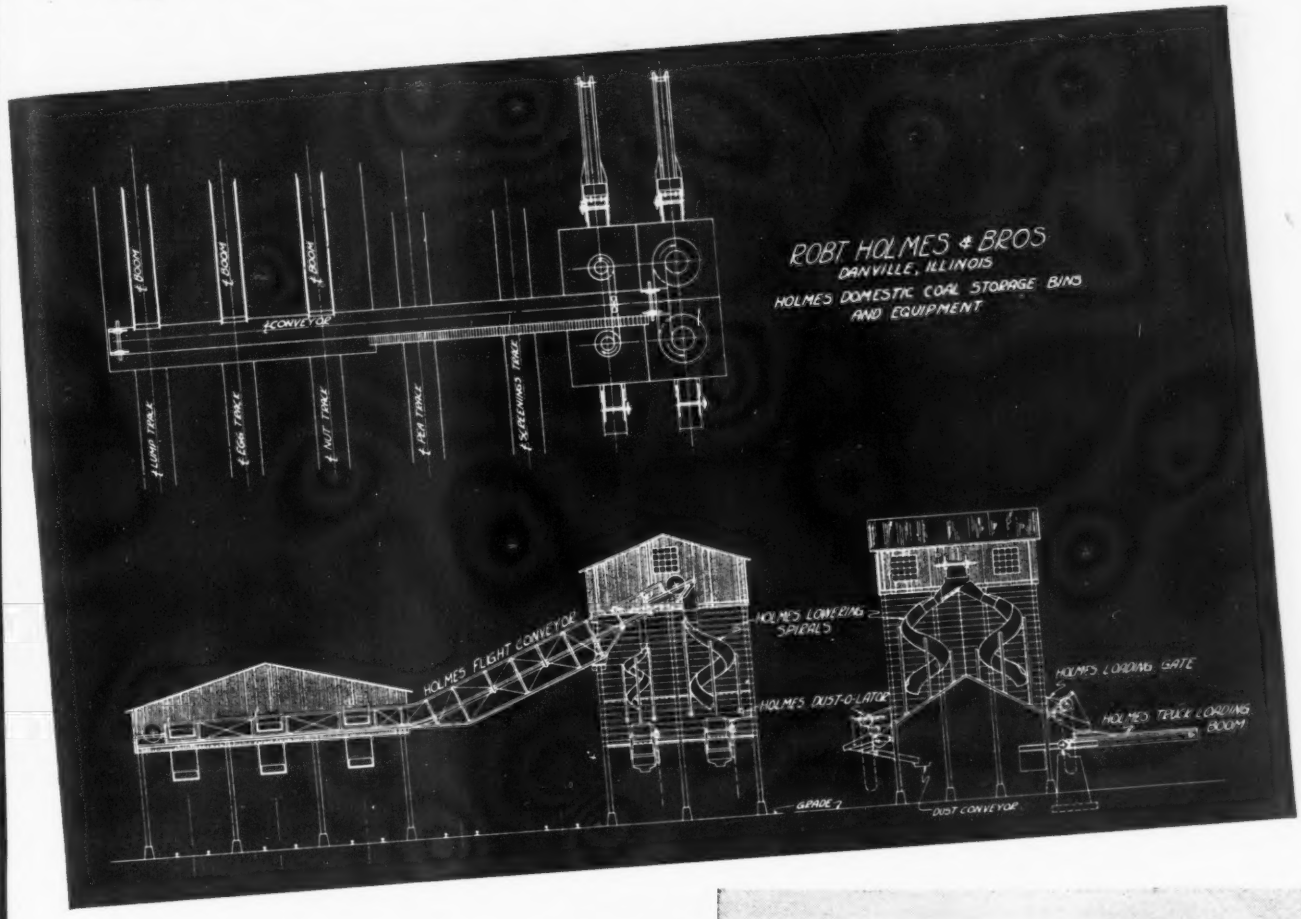
•

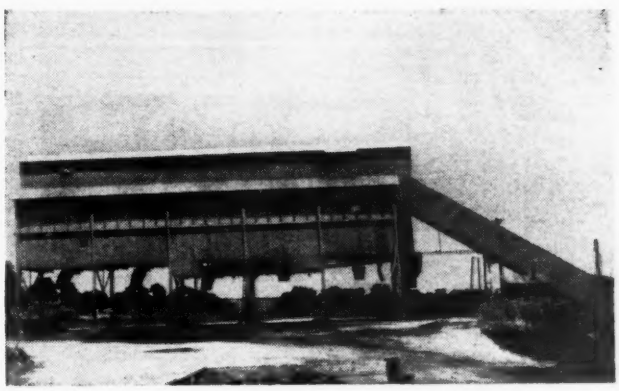
WPB Amends P-56

Non-essential mines in foreign countries ordering needed materials in this country were put under the controls of War Production Board Order P-56 by the July 4 amendment of that order. Heretofore, such mines were not under any definite WPB controls. This move permits the Mining Division to exercise restrictions over them comparable to those applying to domestic non-essential mines, except as may be otherwise ordered by the State Department.

Other changes provided in the amended order are: (1) The appropriate quarterly abbreviation (3Q44 for the third quarter, etc.) must be inserted in the indorsement

Holmes . . . Storage and Preparation Plants





Holmes storage and preparation plants are designed individually to suit your location, conditions and requirements by engineers and fabricators backed by years of practical experience. They eliminate all manual handling of product. Material may be unloaded from R. R. cars to bin or conveyed direct from tipple without interrupting normal loading procedure. Material is lowered into storage bins by Holmes Spirals at an even velocity, reducing breakage to a minimum. Holmes Dust-O-Lators provide a positive mechanical screening to remove all dust as it is delivered to consumer's truck. Duff is conveyed to central storage bin for disposal, keeping a clean, attractive yard. Discharge gates are positive and automatic in operation, preventing emptying of bin by careless drivers.

ROBERT HOLMES AND BROS., INC., Danville, Illinois

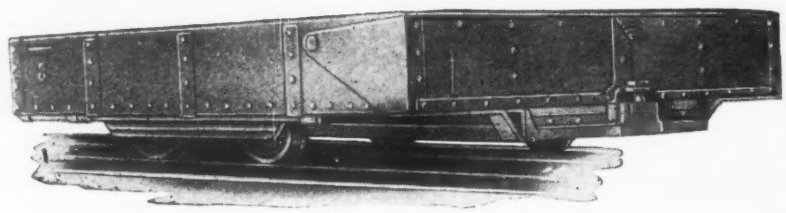
DESIGNERS AND FABRICATORS OF MINING EQUIPMENT FOR OVER 70 YEARS

★ Steelcar ★

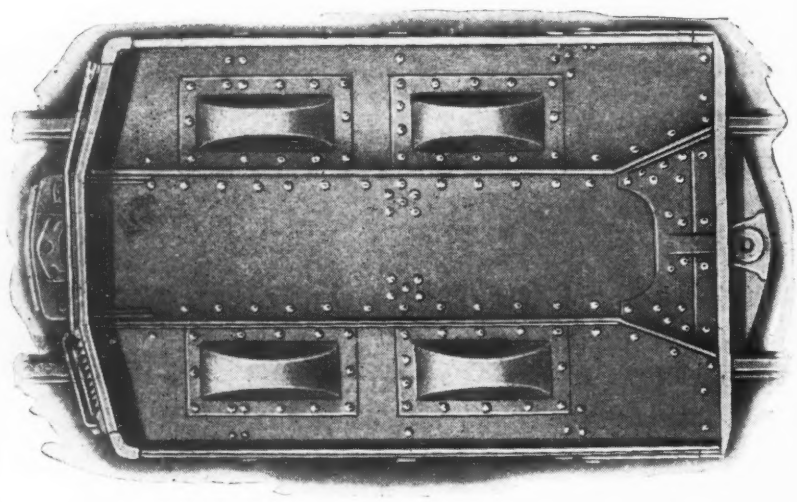
MODERN ★ ★ ★ ★ ★

STEEL COAL MINE CARS

BUILT TO MEET YOUR REQUIREMENTS



Modern, all-steel construction cars—designed to provide greater cubic capacity for your present clearances. Descriptive bulletin and complete specifications sent on request.



PRESSED STEEL CAR COMPANY, INC.
INDUSTRIAL DIVISION
PITTSBURGH, PA.

of orders for controlled materials for maintenance, repair and operating supplies; (2) non-serialized domestic producers applying for higher ratings for minor capital additions now file their Form WPB-1319 with the WPB regional or district office in which the Technical Advisor for Mining for the area is located; any special application form which may be required for certain items must be filed with the Mining Division in Washington, as before: (3) in case of breakdown, imminent breakdown or other emergency, application for WPB assistance may now be made by telegraph or telephone either to the nearest regional or district WPB office or to the Mining Division in Washington.

•

Campaign May Shape Canada Coal Policy

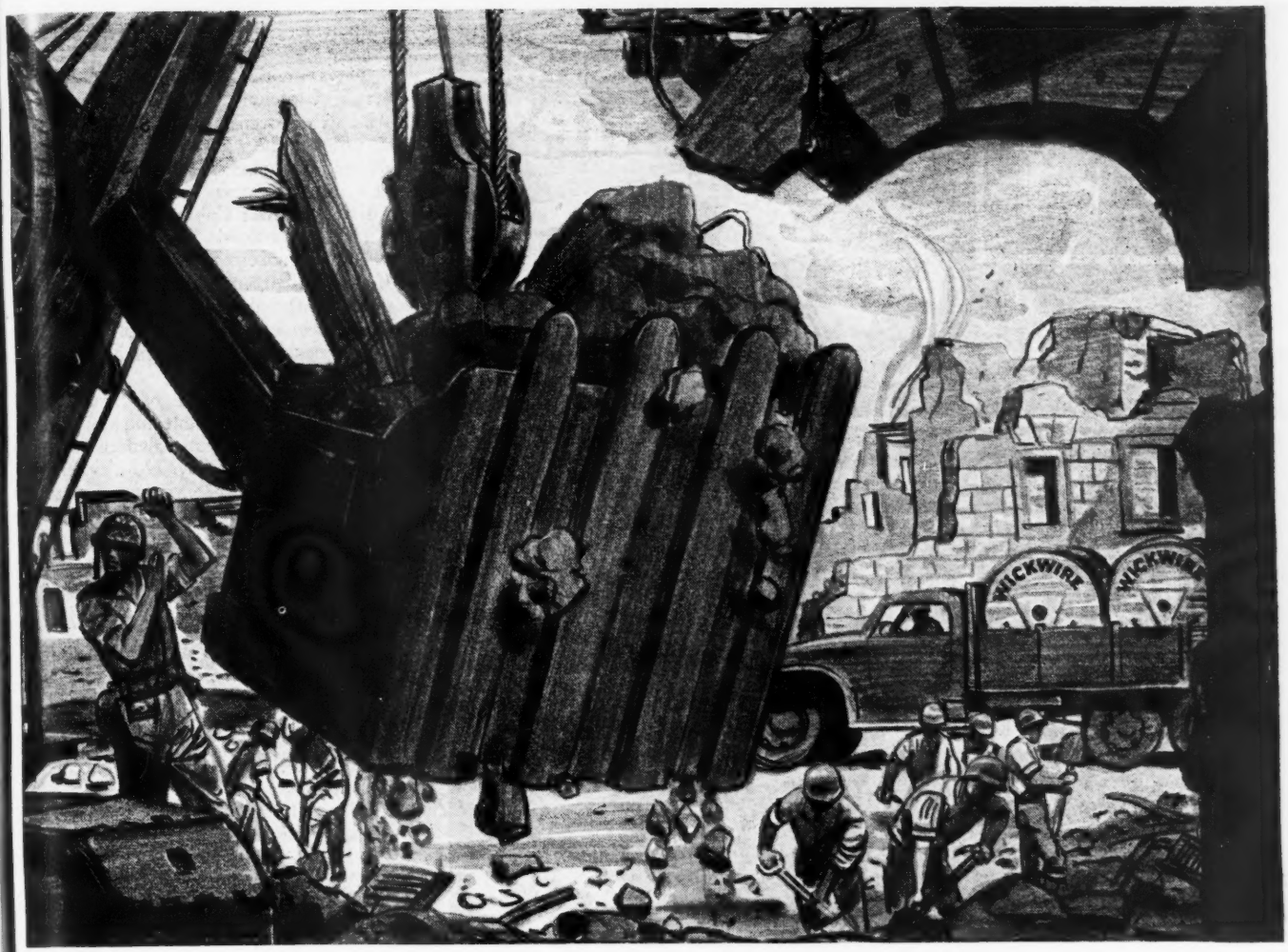
Boards of trade and other groups in Alberta are planning a campaign to expand the market for Canadian coal. A conference of representatives from all branches of the industry, boards of trade and other bodies has been organized, and it is believed that the outgrowth of this movement will be the development of a coal policy for the Dominion.

Adoption of a long-range policy is essential so that both coal producer and consumer can plan future programs, N. E. Tanner, Minister of Lands and Mines, declared at a meeting of the council of the Edmonton Chamber of Commerce at Edmonton, Alta. Mr. Tanner was chairman of the joint delegation, composed of representatives of the government, operators and the miners' union, that reported to the Dominion Government concerning the crisis in Alberta's coal industry.

Reviewing the brief, Mr. Tanner said one of the recommendations was that immediate markets be made available for domestic mines by coal control, using the present facilities or to set up a proper agency to allocate and distribute all surplus coal to government institutions and various services. It also recommended adequate subventions forthwith to insure and maintain the movement east of Winnipeg of coal from Alberta and southeastern British Columbia to railways, retail dealers and other coal consumers.

Operators, he declared, had certain responsibilities and should outline a program that would have the support of all branches of the industry. This should be on a sound basis and worked out for the good of Canada as a whole, he added.

Representatives of leading coal companies in Nova Scotia, New Brunswick, Alberta and British Columbia announced July 11 formation of a Dominion-wide organization to promote and protect the interests of Canadian coal producers. Known as the Canadian Coal Operators' Association, the organization will be headed by W. Lloyd Craig, who resigned as director of the Trade Department in the British Columbia Government to accept the post, with headquarters in Ottawa. The association will cooperate with provincial and federal authorities in developing "an effective fuel policy for Canada and consequent stabilizing of production and

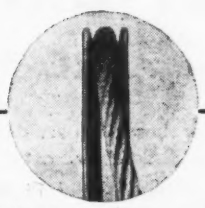


Friend of the "*Cleaner Uppers*"

As the invasion forces go forward shell-holes must be filled—tottering walls brought down and the rubble of destruction removed. And friendly, dependable Wickwire Rope is an old hand at helping the boys who clear the roads and keep supplies moving.

Long-lasting Wickwire Rope is a world traveller these days—as Liberty ship rigging, and in reels for our fighters who are doing the jobs that lead to victory. There are jobs here at home that are vital to success and they also call for strong wire rope. If you need Wickwire Rope it's available on priority, but it pays to make what you now have last as long as possible.

We will be happy to help you with your wire rope problems and also to send you copies of "Know Your Ropes" which offers helpful advice on proper selection, application and usage. Write Wickwire Spencer Steel Co., 500 Fifth Avenue, New York 18, N. Y.



TO AVOID SHOULDER WEAR

Exact alignment of sheaves is important. Our Free book "Know Your Ropes" tells why and shows how to do it. This and 39 other wire rope life savers; 78 "right and wrong" illustrations and 20 diagrams and charts are all contained in this 82 page book.

SEND FOR YOUR FREE COPY

Send your wire rope questions to:

WICKWIRE SPENCER STEEL COMPANY

500 FIFTH AVENUE, NEW YORK 18, N. Y.

Abilene · Buffalo · Chattanooga · Chicago · Detroit · Houston · Los Angeles · Philadelphia · San Francisco · Tulsa · Worcester

THIS SAFETY CLIP
HOLDS WIRE ROPE WITH A
"FIST-GRIP"
Four flat bearing surfaces grip the rope without weakening or distorting it.
Rope ends stay straight, full strength, ready for use again.

THIS ORDINARY CLIP
HOLDS WIRE ROPE WITH A
"FINGER-PINCH"
Rope is crushed and bowed. Rope end is weakened and should be cut off for future jobs when clips are removed.
Strain is distributed unevenly on bowed rope when under tension.

WHY LAUGHLIN
"FIST-GRIP" SAFETY CLIPS
ARE MORE EFFICIENT

Notice how these clips are designed... with identical saddles against the "live" and "dead" ends of the rope and with flat sides. The greater bearing surfaces

1. protect the rope from damage.

2. deliver full rope strength with fewer clips.

Unlike the ordinary U-bolt clip, Laughlin Safety Clips hold mostly by friction. No need to draw bolts so tight that the "live" end is squeezed into the saddle, kinking or crimping the wires . . . no need to apply the clips in one particular way.

Why chance accidents to your workers or damage to your wire ropes? "Fist-Grip" Clips are foolproof . . . they save men, materials, money. Send for free booklet.

FORGING A SHARE IN VICTORY

Distributed through Mill, Mine and Oil Field Supply Houses

THE THOMAS LAUGHLIN Company
PORTLAND 6, MAINE

employment in the industry," said the announcement.

Nova Scotia coal production and the terms of reference of a Royal Commission which the government is to set up soon to investigate the Canadian coal mining industry were discussed in Ottawa July 12 at a meeting between a Nova Scotia delegation and three Cabinet ministers. L. D. Currie, Nova Scotia Labor Minister, acted as chief spokesman for the delegation. Besides discussing the use of coal by-products the delegation planned later to visit research laboratories of the Mines Department where work on byproducts is being conducted.

Officials of the Dominion Coal Co. told a meeting of government and union representatives July 18 that Caledonia and No. 11 collieries, Glace Bay, Nova Scotia, idle Friday nights and Saturdays for several weeks, would work these shifts in future. The company had asserted absenteeism made operation impracticable on these shifts, which was denied by spokesmen for the men.

An order prohibiting enlistment of coal miners in the armed forces until Aug. 1, 1944, has been extended to Aug. 1, 1945, Humphrey Mitchell, Minister of Labor, announced in the Canadian House of Commons. The order allows qualified coal miners to enlist only with the permission of a Selective Service officer.

British Columbia coal mines have been placed under the jurisdiction of the National War Labor Board by the terms of an order-in-council tabled in the Canadian House of Commons by Minister of Labor Mitchell. The order said the action was taken because of the close relationship between coal mining in Alberta and British Columbia. Under a previous agreement, labor relations in British Columbia mines were under the jurisdiction of the Provincial Labor Department.

•

Rename Mingo Mine For Hero Employee

The new Mingo mine of the Pittsburgh Coal Co., on Route 88, near New Eagle, Pa., is to be renamed as a memorial to Staff Sergeant Archie Mathies, a former employee of the company and winner of the Congressional Medal of Honor, who was killed in action Feb. 20. The company decided to change the name to Mathies in honor of the heroic action of young Mathies in attempting to land a crippled Flying Fortress at an English airdrome in an effort to save the life of the injured co-pilot.

Mr. and Mrs. William Mathies, parents of the hero of Finleyville, who was the first resident of that community to volunteer for the Army after World War II started, were notified of the company's action by President J. B. Morrow. Young Mathies, who was employed at Champion No. 3 preparation plant of Montour No. 10 mine, near Library, Pa., was on his sixth mission in the European theatre of war when he lost his life. The company plans to place a plaque with a copy of his citation at the portal of the new mine, which is easily visible from Route 88.

Every Man-Hour Counts

Why lubricate motors twice a week When TWICE A YEAR will do . . .

with

KEYSTONE?

Here's one way to save precious man-hours . . . and they *are* precious in view of the latest estimate by Coal Age that 37,000,000 more tons of coal will be produced this year—by 60,000 less men.

Keystone Ball Bearing End Bells installed on your motors save many man-hours by eliminating the necessity of weekly lubrication—and making *two lubrications a year* suffice.

Much of your motor expense results from sleeve bearings . . . from the wear that occurs in them, and from their continuous oil leakage. Here are troubles that Keystone End Bells check:

1. Oil collects on commutator. This film of oil causes carbon dust (which is the natural result of brush wear) to adhere and to bridge the mica insulation. As this carbon dust accumulates it tends to burn slowly, causing the mica to carbonize and eventually the insulation to break down either to ground or between commutator bars. Result: motor failure.
2. On both A.C. and D.C. motors Keystone Bells, lubricated with grease, *retain their lubricant* and stop troubles due to oil and dust accumulating on coils, or constricting ventilation ducts.
3. Shafts do not wear when provided with ball bearings. This stops costly shaft renewals and trouble No. 1.
4. No need for frequent inspection, as required by sleeve bearings. And—as stated—less frequent lubrication.

For further details write today

SOLD BY

Ohio Ball Bearing Company, 655 Market Street, Youngstown 1, Ohio • Ohio Ball Bearing Company, 330 E. Eighth Street, Cincinnati, Ohio • West Virginia Bearings, Inc., 8 E. Virginia Street, Charleston, West Virginia • Indiana Bearings, Inc., 643 Ohio Street, Terre Haute, Indiana • Bearing Service Company, 9 N. W. First Street, Evansville 1, Indiana • Berry Bearing Company, 2633 S. Michigan Avenue, Chicago, Illinois R-J Bearings Corporation, 3152 Locust (at Compton), St. Louis, Missouri • Associated Bearings Company, 207 E. Twenty-second Street, Kansas City, Missouri • Colorado Industrial Supply Company, 1620 Wazee Street, Denver 17, Colorado • Bearing Service & Supply Company, 68 W. Fourth Street, Salt Lake City, Utah.

KEYSTONE *Electric Company*

1224 RIDGELY STREET . . . BALTIMORE 30 . . . MD.

Your GENUINE FLEXIPIPE is precious... Here's how to protect it

YOUR needs for new Genuine Flexipipe can be filled promptly, but that doesn't minimize the fact that it is made of scarce materials and that, in these war days, it should be carefully conserved. Your *Genuine Flexipipe* is sturdily made of tough materials but, by proper handling and care, you can prolong its life, help the war effort . . . and save money.

Here are a few things to remember: Suspend Flexipipe; don't lay it on the ground . . . Keep it away from sharp rocks, or other cutting or abrasive objects . . . Install angles and curves properly; don't pinch or constrict the tube . . . Whenever possible, between installations, take the Flexipipe above ground for thorough, careful drying . . . Repair holes, tears or damaged places promptly; it's easily done . . . When buying new *Genuine Flexipipe*, be sure to specify the right grade for your requirements; buying the Light Duty Grade for heavy duty work is not good economy.

Mail the coupon today for descriptive literature on *Genuine Flexipipe*.

East Pepperell, Mass.

Specify GENUINE FLEXIPIPE
THE ORIGINAL FLEXIBLE VENTILATING TUBING

BEMIS BRO. BAG CO., 412 Poplar Street, St. Louis 2, Missouri
Please send literature on *Genuine Flexipipe*

*Name*_____

*Company*_____

*Street*_____

*City*_____ *State*_____

Fines Hard-Coal Men, Doubts Culpability

Imposing fines of $61,000 July 26 at New York on 28 anthracite producers adjudged guilty of price fixing, Federal Judge John C. Knox expressed doubt as to the moral culpability of the defendants, who offered no defense against the charges. Declaring they were "legally chargeable with the offense alleged against them," the jurist proceeded: "I doubt the validity of the government's contention that the public, as a result of the misdeeds of the defendants, was really made to suffer. Indeed, if the detriment that has come to the public were to be balanced against the advantages if has received one might plausibly argue that the defendants, instead of being evil-minded malefactors, were animated by worthy motives and accomplished good ends.

"The anthracite coal industry, as most well-informed persons will admit, has long been critically ill; and even now I am aware of no immediately available panacea that will cure its ailments. The public needs and must have coal. Thousands of miners who cannot readily be absorbed into other lines of endeavor need, and must have, work. Otherwise, they will be upon public relief.

Competes With Stolen Coal

"Millions upon millions of dollars, yielding little or no return, are invested in a natural resource of inestimable value. Its owners, instead of being permitted to operate their properties, and to have the protection of the law in doing so, were forced to market their products in competition with huge quantities of coal that, with apparent acquiescence upon the part of Pennsylvania authorities, were stolen from its rightful owners.

"In addition, the sale of anthracite coal, in ordinary times, must compete with other and more conveniently handleable types of fuel. Considerations such as these, and others of a similar nature, tend to explain—although they cannot wholly excuse—the wrongful conduct for which the defendants were indicted."

The court suspended sentence on 26 officials of the corporations, but imposed the following fines on companies: Glen Alden Coal Co., $5,000; Delaware, Lackawanna & Western Coal Co., $5,000; Susquehanna Collieries Co., $3,000; M. A. Hanna Co., $5,000; Pennsylvania Coal Co., $3,500; Lehigh Navigation Coal Co., $3,000; Pattison & Bownes, $1,500; Philadelphia & Reading Coal & Iron Co., $5,000; Lehigh Valley Coal Co., $5,000; Hudson Coal Co., $5,000; Cranberry Improvement Co., $1,000; East Bear Ridge Colliery Co., $1,000; Edison Anthracite Coal Co., $1,000; Moffat Coal Co., $1,250; Jermyn-Green Coal Co., $1,500; Locust Coal Co., $1,250; Mineral Springs Coal Co., $750; No. 9 Coal Co., $750; Sullivan Trail Coal Co., $750; Payne Coal Co., $1,750; Penn Anthracite Collieries Co., $1,000; Pompey Coal Co., $1,000; Russell Mining Co., $1,000; Stevens Coal Co., $1,000; Volpe Coal Co., $1,000 William Penn Colliery Co., $1,000; Jeddo-Highland Coal Co., $1,750; Weston Dodson & Co., $1,250.

SNAPSHOT of an explosion

HERE IS A STORY OF AN EXPLOSION—as told by the explosive itself. The narrow, white streak at the right is the path of detonation, flashing through the explosive at about 250 miles a minute! The feathery haze is a photographic record of white-hot gases bursting outward at tremendous pressures as high as a million pounds to the square inch.

Facts such as these are recorded, studied, and analyzed by Hercules scientists. Each day scores of research projects are carried on to broaden the knowledge and understanding of explosives. It is through constant, intelligent research that we endeavor to help you and thus benefit ourselves.

HERCULES EXPLOSIVES

HERCULES POWDER COMPANY
INCORPORATED
936 King Street
Wilmington 99 . . . . . Delaware

Their First Chance Flotation Process...

Led to a Second Installation...

Repeat orders are indicating the value of the Chance Sand Flotation Process. For example: The Berwind-White Coal Mining Co., Maryland mine, installed a plant of 200 TPH washer capacity. Later a second washer of equal capacity was installed in their Mine #40. This is only one example of repeat orders. Why not investigate this process? It offers you many profitable savings. Write for literature today.

UNITED ENGINEERS & CONSTRUCTORS INC

NEW YORK 17 · PHILADELPHIA 5 · CHICAGO 2

Personal Notes

J. R. Bazley, well-known anthracite stripping contractor, of Pottsville, Pa., is on his second visit to Great Britain to advise that nation's coal industry concerning the development and operation of coal-stripping projects.

H. Maurice Carlson, mechanical engineer, has been appointed to the staff of Battelle Memorial Institute, Columbus, Ohio, and assigned to its division of fuels research. He is a graduate of the University of Minnesota, from which he holds a Bachelor of Science and a Bachelor of Mechanical Engineering degree. He formerly was an instructor at that university. In his new position Carlson will be immediately concerned with research on improved methods for the utilization of bituminous coal.

Dr. Huston St. Clair, of Tazewell, Va., past president of the Virginia State Chamber of Commerce and president of the Jewell Ridge Coal Corp., the Pocahontas Mining Corp. and the Virginia Smokeless Coal Co., has accepted the State chairmanship of the Committee for Economic Development. He succeeds Homer Ferguson, president of the Newport News Shipbuilding & Drydock Co.

L. H. Summerlin, formerly mine foreman at the Lindbergh mine of the Brookside-Pratt Mining Co., has been appointed superintendent of the company's Warrior River mine, Carbon Hill, Ala., vice C. A. Bell, resigned.

Alex Grant, for the last five years with the Rocky Mountain Fuel Co., Denver, Colo., has accepted a position as general manager of the Boulder Valley Coal Co., now operating three mines, two in northern Colorado and one in Routt County. The new one is just about down to the coal and will be in production soon. He was for ten years assistant superintendent at Federal No. 1 mine of the Koppers Coal Division, Grant Town, W. Va., and served two years as manager at the Maiden mine of the Kelley's Creek Colliery Co., Morgantown, W. Va.

Alex Grant

Stearns

Spout

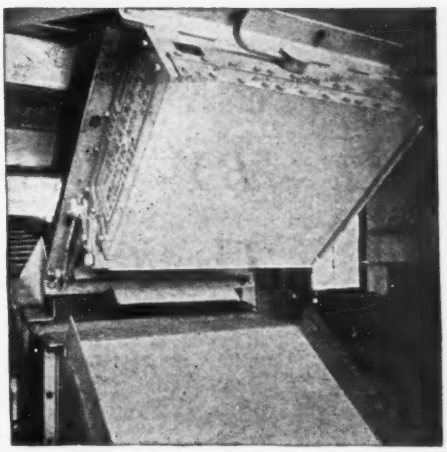
MAGNETS

PROTECT

against

TRAMP

IRON



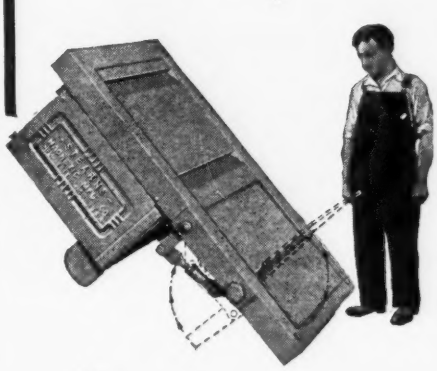
A typical Stearns Spout Magnet installation and the resulting accumulation of tramp iron from several days' operation. And—the scrap metal recovered helps substantially toward paying for the magnetic equipment.

In this age of mechanization, tramp iron and metallic junk in your coal flow can be efficiently, automatically and economically removed with Stearns Magnetic equipment.

Our many years of pioneering experience in designing magnetic equipment for the coal industry enables us to be of profitable assistance in controlling your tramp iron problem.

Cost is negligible compared with the definite results obtained. It will pay you to investigate Stearns Magnetic methods. Let us show you how Stearns magnets can be put to work for you.

Write for Bulletin 97 on Stearns Spout Magnets; Bulletin 302, Stearns Magnetic Pulleys; Bulletin 25, Suspended Magnets.



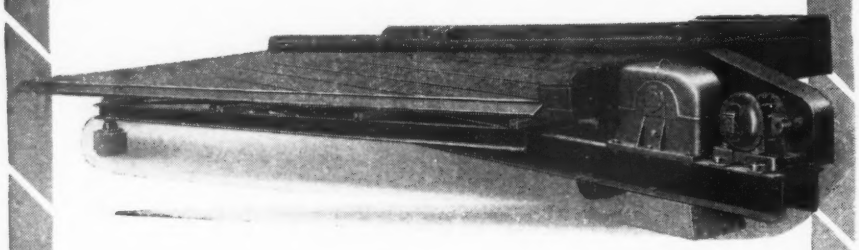
Stearns Engineers are well qualified to advise you.

Ask for our recommendations. No obligations.

STEARNS MAGNETIC MANUFACTURING CO.

661 S. 28th St., Milwaukee, Wis.

BY COMPARISON—
They Choose SuperDuty



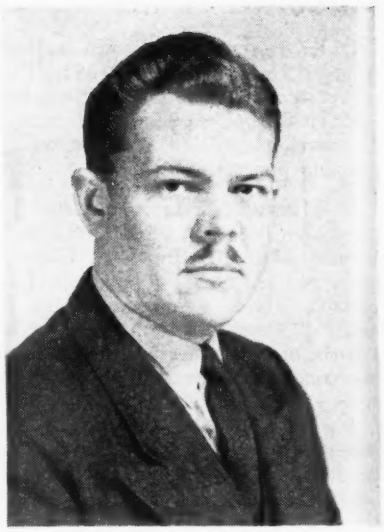
Hundreds of coal mine operators have done just that . . . *they compared* and chose SuperDuty Diagonal Deck Coal Washing Tables. Backed by 38 years of engineering "Know-How", Super Duty Tables assure them of maximum recoveries at minimum costs . . . they increase daily output of marketable coal and save many hours of critical time and labor.

SuperDuty tables operate at a very low maintenance and power consumption cost . . . users report yearly upkeep practically negligible . . . power required is less than 1½ HP under full load operation. The high quality materials and perfectly balanced construction give extra years of efficient, profitable coal washing.

That's why SuperDuty is first choice of hundreds of leading coal mine operators. Compare —and see for yourself the big difference. Write for illustrated Bulletin No. 119-A and complete details.

THE DEISTER ★
CONCENTRATOR
COMPANY
909 Glasgow Ave. • Fort Wayne, Ind., U.S.A.
COPPERCO PRODUCTS

★ *The ORIGINAL Deister Company • Inc. 1906*



George W. Land

GEORGE W. LAND has joined the West Kentucky Coal Co., Earlington, Ky., as research and combustion engineer. He goes to the company from Battelle Memorial Institute, Columbus, Ohio, where he has been engaged in research work in coal. After graduation from Southern Illinois University, with a Bachelor of Science degree, and from the Graduate School at the University of Illinois, with a Master's degree, he was with the Illinois State Geological Survey as coal analyst and research assistant. At Battelle his work has been in connection with surface preparation (dustless and chemical treatment) and in combustion of coal in stoves and stokers.

ALFRED COPELAND CALLEN, dean of the College of Engineering at Lehigh University, and for 15 years head of the department of mining and metallurgical engineering, University of Illinois, has been named chairman of the industry education division of the American Institute of Mining and Metallurgical Engineers.

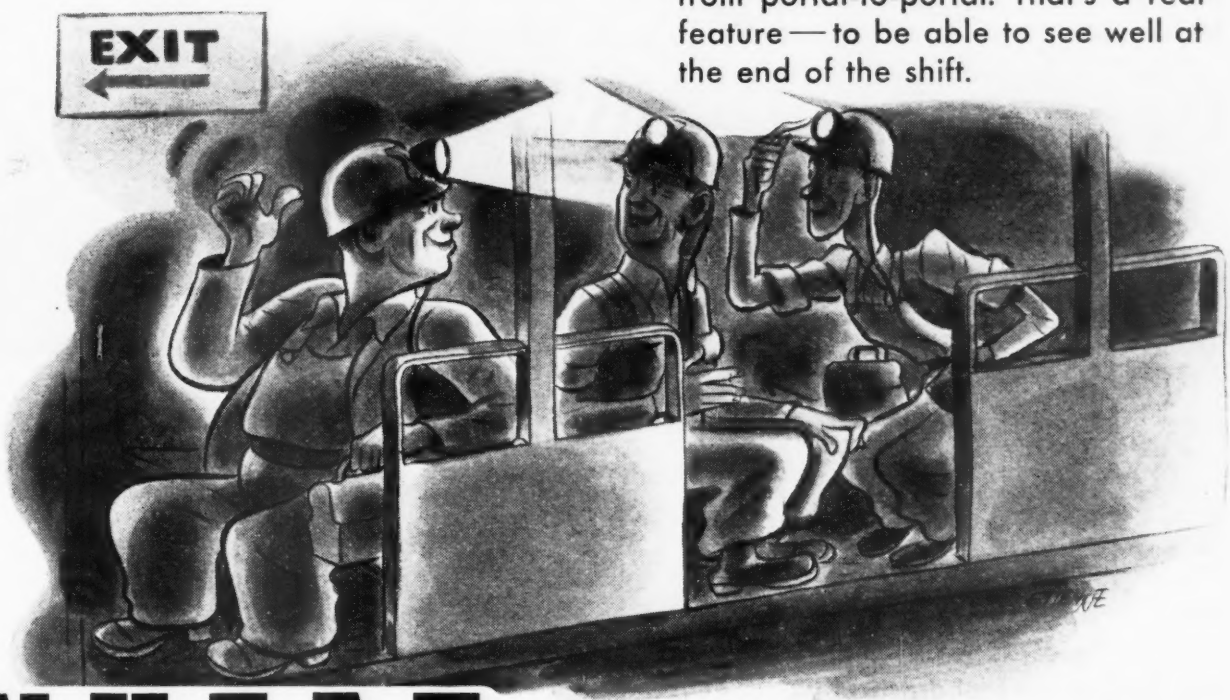
W. B. WARDROP, on retiring as Pennsylvania mine inspector, after 23 years of service, was honored July 15 with a testimonial dinner in Indiana, Pa., where he resides. Three hundred persons were present, including Richard Maize, State Secretary of Mines. Mr. Wardrop entered the mines at the age of nine as "quarter-turn helper" at the operation of the Duncan McGee Coal Co., Clermont, McKean County, Pa. Later, he became superintendent of the Pittsburgh Gas Coal Co.'s mines and for a while managed an operation of his own. Wrist watches were presented at the dinner to Mr. and Mrs. Wardrop.

THOMAS A. HORNE has been promoted to the post of manager of Vancouver Island Coals, Ltd., Vancouver, B. C. Prior to joining this company Mr. Horne was with Dodwell & Co.

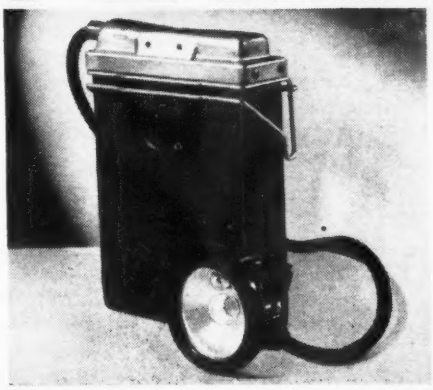
W. D. BRYSON, formerly manager of mines for the Utah Fuel Co., with operations in Utah and Colorado, has become manager of operations for the Hayden Coal Co. at Haybro and Grassy Creek, Colo.

Tim Malloy *says...*

Am I glad we use Wheat Approved Cap Lamps — they burn brighter from portal-to-portal. That's a real feature — to be able to see well at the end of the shift.



WHEAT *the approved cap lamp*

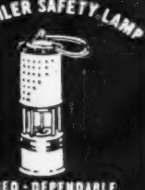


THESE FEATURES MAKE *WHEAT* THE OUTSTANDING ELECTRIC CAP LAMP

- Two bulbs (one for emergencies)—miner is never in the dark.
- Headpiece weighs less than 6 ounces, Lamp Cord 6 ounces, Battery 62 ounces—Total weight of Lamp complete, 74 ounces.
- Headpiece molded of strong bakelite, sealed, moisture-proof and dust-proof.
- Rubber battery case—non-conductor of electricity—a valuable safety feature.
- Battery solution (free) limited to one ounce total both cells.
- Lead-acid type battery maintains high voltage throughout shift (80+ percent efficiency)—year after year.
- Battery charged through headpiece and cord of cap lamp—a daily test of all connections.
- Designed for self-service charging system for lowest lamp-house operating cost.
- To charge, headpiece is simply slipped on to key in charging rack, and turned to make contact. Nothing to take apart—unit-sealed construction.

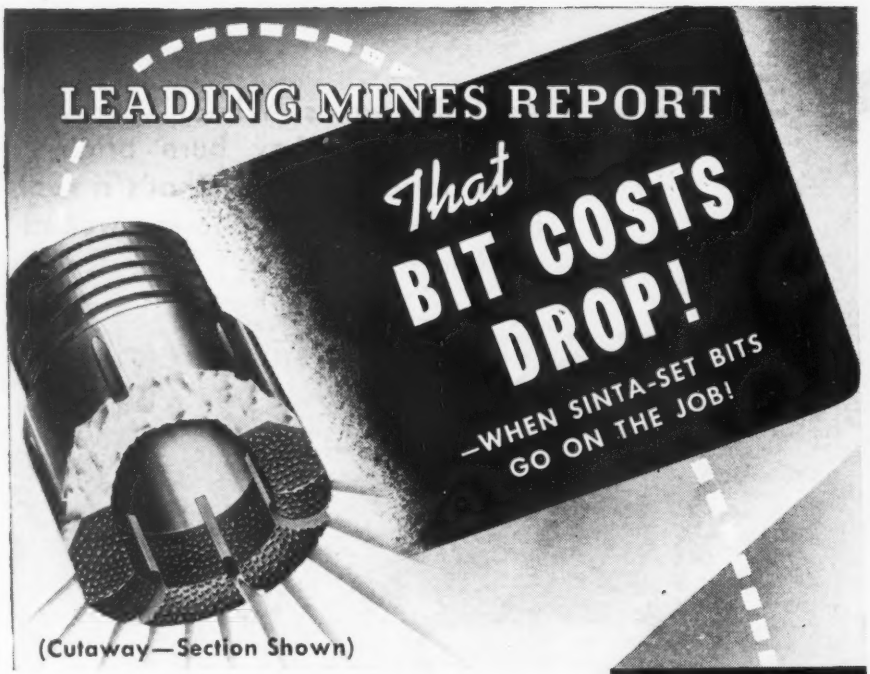
WHEAT LAMP SALES, INC.
1501 Kanawha Valley Bldg.
Charleston, W. Va.

SPECIALISTS IN MINE LIGHTING FOR 30 YEARS
KOEHLER MFG. CO.
Marlboro, Mass.



RUGGED - DEPENDABLE
SENSITIVE

OTHER SALES REPRESENTATIVES
E. D. BULLARD CO.
San Francisco
Chicago
B. C. EQUIPMENT CO., LTD.
Vancouver, B. C.
H. C. BURTON & CO.
Hamilton, Ontario
OLDHAM & SON, LTD.
Manchester, England



(Cutaway—Section Shown)

IN SOUTH AMERICA
Drilling porphyritic rock formation at .069c per foot drilled.

IN ARIZONA
300 ft. of continuous drilling through Arkose formation . . . 2900% greater life than black carbon bits.

IN MINNESOTA
Bit cost per foot reduced 74%, drilling through iron ore, jasper and green rock.

Many leading mines in the United States and foreign countries report outstanding records with Sinta-Set Core Bits. Bit cost per foot drastically reduced! Bit life increased as much as three to four times greater than ordinary bits!

Your mine, too, can obtain this high order of performance. The new, improved-type Sinta-Set Bit, containing high quality diamonds throughout a special tungsten carbide matrix, provides 90% utilization of diamonds in drilling all formations. Saves money all along the line! Less bit cost per foot, reduced inventory of bits, less reconditioning time!

Try Sinta-Set Bits and watch costs drop! Core and casing bits, sizes EX, AX, BX, NX carried in stock. Write for catalog.

SEND FOR NEW CARBOLOY CATALOG

CARBOLOY COMPANY, INC.
11185 E. Eight Mile Street Detroit 32, Michigan

SALES AGENTS

Sprague & Henwood, Inc. Scranton, Penna.
Caird Engineering Works Helena, Montana
E. J. Longyear Minneapolis, Minn.
Int'l General Electric Co. Schenectady, New York
Christenson Diamond Products Co. Salt Lake City, Utah

SINTA-SET TRADEMARK DIAMOND CORE BIT

Richard Maize

RICHARD MAIZE, Acting Secretary of Mines of Pennsylvania since January, 1943, has been appointed full Secretary of Mines by Governor Martin.

BOB ATCHISON, formerly mine foreman at Montour No. 9 mine of the Pittsburgh Coal Co., McDonald, Pa., has been made superintendent of Montour No. 9 and Solar mines.

STANLEY RADZIWON, safety inspector for the Pittsburgh Coal Co., has been named standards engineer in the production department.

HORACE MORGAN, time-study engineer with the Pittsburgh Coal Co., has been appointed assistant engineer at Montour No. 4 mine, Lawrence, Pa.

•

Preparation Facilities

CHAFIN-JONES-HEATHERMAN COAL CO., Peach Creek, W. Va.—Contract closed with Kanawha Mfg. Co. for a Kanawha-Belknap washer for 2¾x¾-in. coal; capacity, 70 t.p.h.

CONSOLIDATION COAL CO., Mine 207, Jenkins, Ky.—Contract closed with Fairmont Machinery Co. for necessary equipment and structure to clean ⅜x⅛-in. coal in existing Chance cones instead of with equipment originally furnished; additional Allis-Chalmers vibrating screens to be furnished to dewater this coal and units formerly used to treat it will be used to re-treat ⅛-in.x50-mesh middlings. Probable completion date, Sept. 15.

PRINCESS DOROTHY COAL CO., New Mine near Van, W. Va.—Contract closed with Kanawha Mfg. Co. for complete coal-handling and preparation equipment consisting of dump bin for drop-bottom mine cars, monitor plane 1,600 ft. long utilizing 12-ft.-diameter spool-type drum, 15-ton monitors, Parkersburg hydromatic brake, belt conveyor from monitor discharge bin to tipple, five-track tipple with shaker screens for primary separation, vibrating screens for fine separation, four loading booms, mixing conveyor and

AMERICAN Type "S" ROLLING RING CRUSHER

THE POSITIVE ASSURANCE OF UNIFORM SIZES · · · · ·

for either stoker or pulverized coal even as you crush large tonnages

COMPACT

Easily Accessible

•

Externally Adjusted

The splitting action of the SHREDDER RINGS shatters and distributes the coal before it reaches the Breaker and Grinding Plates.

These patented reversible manganese steel SHREDDER RINGS are found only in the American Rolling Ring Crusher. They have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at the specified speeds. In contact with solid metal, the rings are momentarily deflected from their usual course because they are free to swing back out of position. There are no shear pins or other safety devices that require attention.

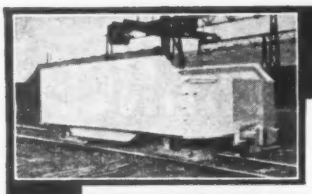
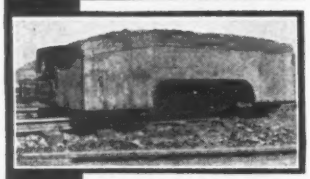
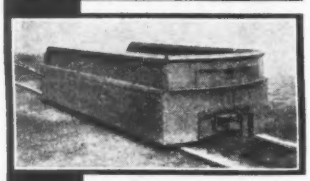
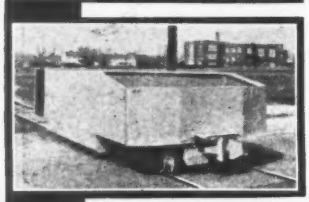
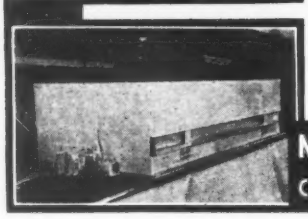
★ You can economically provide for immediate large tonnage crushing and for post war requirements. At the same time you get the assurance of uniform sizes for either stoker or pulverizer coal. In service for many mines the American Rolling Ring Crusher demonstrates its ability to crush coal at a total of less than one cent per ton, including power, labor, maintenance, and interest on investment. The splitting action of our patented manganese steel shredder rings reduces fines to a minimum—the coal is split instead of being crushed.

There's a type of unit exactly applicable to your requirements. Let us make recommendations based on our long and wide experience. Each crusher is guaranteed for the job—each is compact, externally adjusted—easily accessible.

•

AMERICAN PULVERIZER COMPANY 1119 MACKLIND AVENUE ST. LOUIS 10, MISSOURI

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

More Coal per Day

At Less Cost per Ton

This has been accomplished at many mines where cars are equipped with Willison Automatic Couplers.

For rapid and safe handling of larger capacity cars used in modern mechanized mines, the Willison Automatic Coupler is the answer.

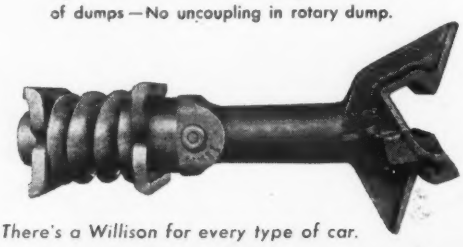
The Willison Automatic Coupler offers many advantages including:

Safety in operation—It is not necessary to go between the cars to couple or uncouple.

Faster shunting and gathering of cars—Automatic coupling saves time.

Less spillage of coal—Smooth operation of train reduces surging and car derailments.

Operates satisfactorily through all kinds of dumps—No uncoupling in rotary dump.



There's a Willison for every type of car.

NATIONAL MALLEABLE & STEEL CASTINGS CO.
CLEVELAND ..... OHIO

P-G Automatic TRANSFER SWITCH

PROMOTES Safety AND INCREASES PRODUCTION

Eliminates hand switches—entirely automatic. No shocks or burns to operator while changing from trolley to reel or vice versa. Simple, safe, efficient, easy to install, can be mounted anywhere. For 250 or 550-volt service in single or double trolley and reel. Complete with cover.

THE POST-GLOVER ELECTRIC COMPANY
•ESTABLISHED 1892•
221 WEST THIRD STREET, CINCINNATI, 2 OHIO

COMING MEETINGS

- **Kentucky River Mining Institute: annual meeting, Sept. 22, Hazard, Ky.**
- **National Safety Congress and Exposition: Oct. 3-5, Sherman, Morrison and LaSalle hotels, Chicago.**
- **Coal Division: American Institute of Mining and Metallurgical Engineers, and Fuels Division, American Society of Mechanical Engineers: fall meeting, Oct. 23 and 24 Daniel Boone Hotel, Charleston, W. Va.**

crusher; tipple and belt gallery are to be of steel construction while monitor bins will be of wood; capacity, 300 t.p.h.

HYDROTATED ANTHRACITE FUEL CO., INC., Minesville, Pa.—Contract closed with Deister Concentrator Co. for one Concenco-revolving feed distributor.

HEYDEN CHEMICAL CORP., CHEROKEE ORDNANCE WORKS, South Danville, Pa.—Contract closed with Deister Concentrator Co. for four SuperDuty diagonal-deck No. 7 coal-washing tables to clean No. 4 buckwheat coal.

LEGAL COAL CO., Hegins, Pa.—Contract closed with Wilmot Engineering Co. for three Type D Wilmot Simplex jigs to prepare stove, nut and pea coal; feed capacity of each jig, 20 t.p.h.

STEVENS COAL CO., Westwood Colliery, Tremont, Pa.—Contract closed with Wilmot Engineering Co. for one 6-ft. diameter Wilmot Hydrotator to prepare barley coal; clean-coal capacity, 30 t.p.h.

MONTANA COAL & IRON CO., Foster Mine, Washoe, Mont.—Contract closed with Jeffrey Mfg. Co. for one diaphragm jig; raw-coal feed capacity, 60 t.p.h. of 3x½-in. coal.

•

Association Activities

VIRGINIA COAL OPERATORS' ASSOCIATION reelected its officers at its annual meeting, as follows: George H. Esser, president and secretary-treasurer; H. W. Meador, vice president; E. H. Robinson, assisant secretary-treasurer; and to serve on the board of the Southern Coal Producers' Association, E. P. Humphrey and C. F. Connelly.

UTAH COAL OPERATORS' ASSOCIATION has elected as president Claude P. Heiner, general manager, Utah Fuel Co. A. B. Foulger, general manager, Lion Coal Corp., has been elected vice president, and B. P. Manley reelected executive secretary.

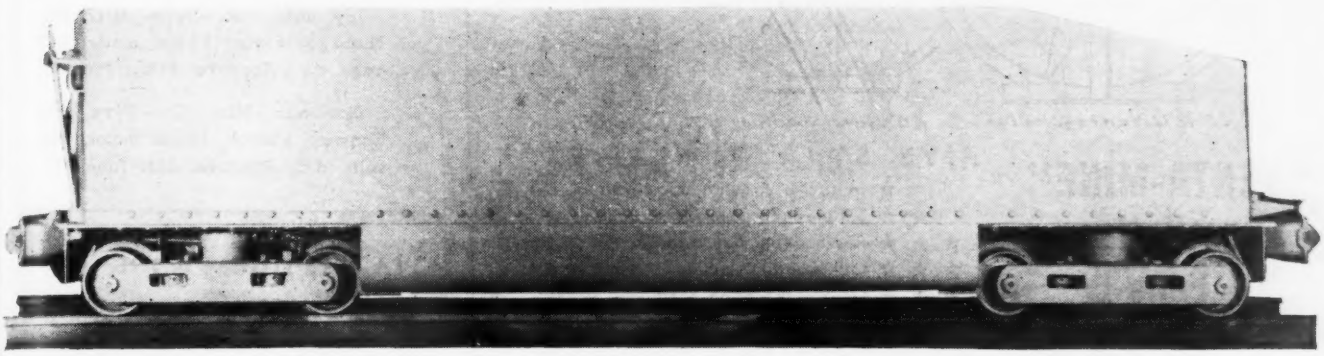
COLORADO & NEW MEXICO COAL OPERATORS' ASSOCIATION elected W. J. Thompson as president at its annual meeting, with Douglas Millard as vice president; E. M. Oliver, second vice president, and F. O. Sandstrom, secretary-treasurer.

Big, modern cars alone, as pointed out elsewhere in this issue, can save 10c. a ton or more in haulage cost and improvement in face operations.

From April, 1944 Coal Age

BIG MINE CARS

Could Save $68,000,000 on 1944 Coal Production

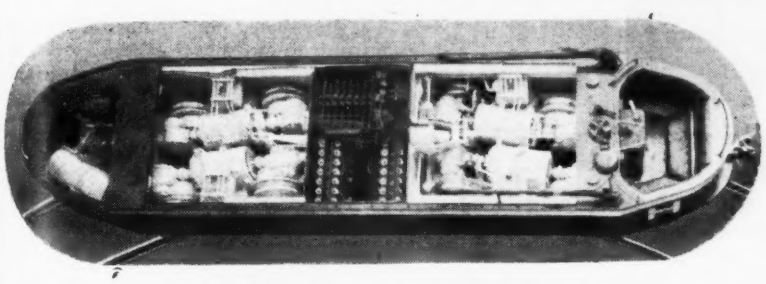


DIFFERENTIAL

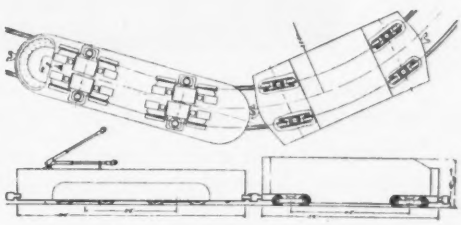
8 WHEEL AXLESS MINE CARS

● Operators are finding that savings of 10 cents a ton or more are possible by the use of large mine cars. With the industry requirements for this year reaching a total tonnage of 688,000,000 tons of coal, the saving possible by the use of large cars would amount to $68,000,000 in round numbers.

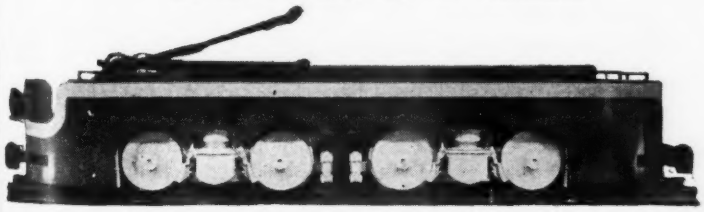
The advantages of the Differential 10 ton 8-wheel AXLESS mine cars are clearly evident. Their greater carrying capacity within a limited height—the fewer car changes required behind the loader—the increased tonnage handled at each car spotting all point to more tons per shift and a lower cost per ton.

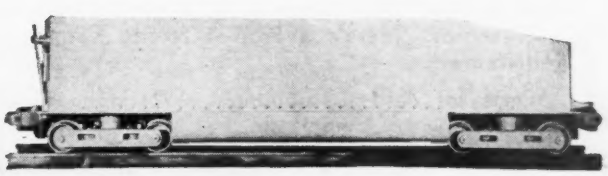


"A lot of Locomotive in a Small Package." 360 H.P. one hour, 308 H.P. Continuous



Powerful Locomotives and Fast Large Cars LOWER COSTS.



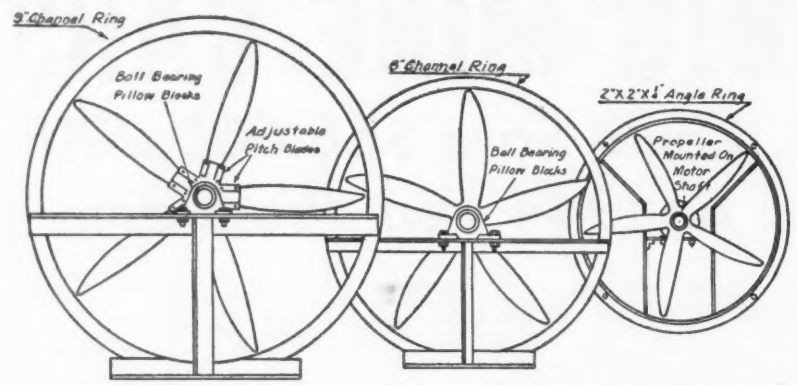


DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO, U. S. A.

Builders of Haulage Equipment Since 1915

AIR DUMP CARS · MINE CARS · MINE LOCOMOTIVES · ROCK LARRIES · DUMPING DEVICES
BURDEN-BEARING LOCOMOTIVES · STOCKPILING CARS · COMPLETE HAULAGE SYSTEMS



60" & 72" Venta-Mine Fan 48" Venta-Mine Fan 36" Venta-Mine Fan

"VENTA-MINE" Ventilating Fans

FIVE STAR QUALITIES

★ High All Around Efficiency
★★ Simplest Possible Construction
★★★ Replaceable Ball Bearing Pillow Blocks
★★★★ Lightweight Aluminum Propeller Blades
★★★★★ Double Extension Shaft

PERFORMANCE CHART:

Capacities in thousands of cubic feet per minute vs inches of water pressure.

Size	H.P.	R.P.M.	Static Press. Free Air	.1"	.2"	.3"	.4"	.5"	.6"	.7"	.8"	.9"	1.0"	1.1"	1.2"
36"	2	1750	16.5	15.5	14.0	13.0	11.5	10.5	9.0	7.4	5.5	3.5			
48"	5	1150	30.0	28.4	26.0	23.0	19.0	15.0	10.5	6.5	2.0				
48"	10	1750	49.0	47.0	44.5	42.0	40.0	37.5	34.0	32.0	29.0	26.5	24.0	22.0	18.0
60" LOW PITCH	7½	1150	41.0	40.0	39.0	37.0	34.5	31.0	27.0	23.0	19.0	14.5	10.0	5.0	
60" HIGH PITCH	15	1150	84.0	83.0	82.0	80.0	78.0	74.5	71.0	67.0	63.0	57.0	50.0	42.5	35.0
72"	20	900	100.3	96.0	93.0	89.0	85.0	81.0	78.0	74.0	69.5	65.0	60.0		
72"	25	900	118.5	108.0	105.0	100.0	97.0	94.0	89.0	85.0	81.0	77.0	73.0		

GUYAN MACHINERY CO., LOGAN, W. VA.

DON'T MAKE THE MISTAKE OF THINKING ALL BEARING MATERIALS ARE ALIKE

When you specify Promet you are assured of a specific formulae designed to best serve each specific requirement and application.

Specializing in bronze bearings and bushings for coal mining equipment, we can give a money-back guarantee of superior service with our product.

Machinists prefer Promet bar stock (cored or solid) because it machines easily. Rounds, hexagons, and squares, in rough cast, semi-finished, or fully machined. Cored bar stock available in all sizes (by 1/8" steps) from a 1/2" minimum core to 12" O. D. and 12" lengths. There's a Promet Bronze Formulae for your every requirement.

Parts for Jeffrey, Goodman, Westinghouse, General Electric, Sullivan, Joy Equipment, etc.

Write for free descriptive booklet.

PROMET — THE Engineered BRONZE

THE AMERICAN CRUCIBLE PRODUCTS CO.
1307 Oberlin Ave., Lorain, Ohio, U. S. A.

Prompt deliveries can usually be made from stocks maintained at

BECKLEY, W. Va., The Universal Supply Co., Corner 2nd Ave. and 2nd St.	Phone 3642
LORAIN, OHIO, The American Crucible Products Co.	Phone 6983
WILLIAMSON, W. Va., Williamson Supply Co.	Phone 1200

Other Representatives

ALTON, ILL., Frank E. Rhine, 623 Blair Ave.	Phone Alton 3-8624
BIG STONE GAP, VIRGINIA	C. P. Cawood
BIRMINGHAM 1, ALA., O. D. Lindstrom Equipment Co.	P. O. Box 103
CANTON, OHIO, Bowdil Company, Waynesburg Road	Phone 29-808
MT. LEBANON, PA., J. E. Nieser, 720 Roselawn Ave.	Phone Pittsburgh 9876
DENVER, COLO., Urquhart Service, 16th Street at Blake	Phone Main 0331

Equipment Approvals

Three approvals of permissible equipment were issued by the U. S. Bureau of Mines in June, as follows:

Joy Mfg. Co.—Type 5SC-2PD shuttle car (storage-battery operated): three 7½-hp. motors, 90 volts, d.c.; Approval 509; June 15.

Joy Mfg. Co.—Type U-179-34F chain conveyor; 20-hp. motor, 500 volts, d.c.; Approval 510A; June 21.

Goodman Mfg. Co.—Type 125 Conway shovel; 50-hp. motor, 250 volts, d.c.; Approval 511; June 28.

N.C.A. Intervenes In Natural-Gas Cases

Petitions to intervene in two natural-gas cases before the Federal Power Commission have been filed by the National Coal Association and the United Mine Workers of America. In the Kentucky Natural Gas Co. case, the applicant seeks authority to construct a 16-in. line in Kentucky to interconnect with the main line of the Tennessee Gas & Transmission Co., now under construction. In the other case, the applicant, the Northern Natural Gas Co., seeks authority to pipe natural gas into St. Paul, Minn. Hearings on the latter case were scheduled to begin July 26 in St. Paul.

•

Coal Doing Its Job Says McAuliffe

The growth and development of the coal industry is inseparable from the growth of nearly every other industry in America, said Eugene McAuliffe, president, Union Pacific Coal Co., as guest speaker on the "Your America" program of the Union Pacific R.R. July 22. Carried on 46 N.B.C. stations from coast to coast every Saturday at 4 p.m. (C.W.T.), the program emanates in Omaha, Neb., U.P. headquarters.

"When war came to America," Mr. McAuliffe continued, "the coal industry responded by producing, in 1942, more bituminous and anthracite coal, combined, than ever before, and in 1943 we reached the all-time high of 649,000,000 tons.... But coal is not used alone in furnaces and boilers. From coal we are manufacturing and can manufacture hundreds of other worth-while products, including drugs, dyes and other chemicals, oil and gasoline, alcohol and plastics. The coal industry looks forward to the opportunty of making vast and vital contributions to the postwar world.

"Meanwhile there is a job to do. The trains to carry men and munitions must be kept moving, and the mills and factories must be powered, while the home front must be kept supplied with fuel. We upon whose shoulders the responsibility rests

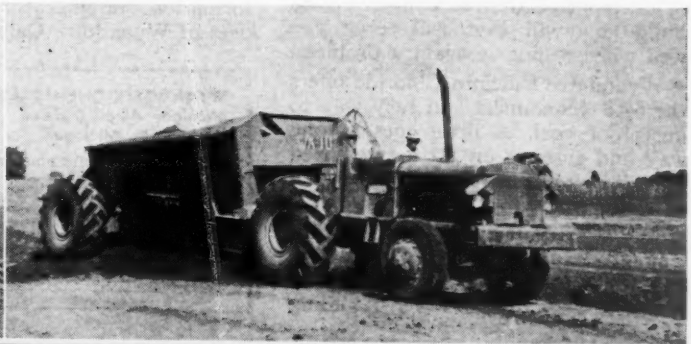
Dependable EUCLIDS COST LESS TO OWN

On scores of big earth and rock moving jobs, and in industrial operations too, Rear-Dump and Bottom-Dump EUCLIDS are moving more yards and tons per hour at consistently lower cost. Carrying pay loads of 15 to 30 tons at speeds up to 33 m.p.h., EUCLIDS cut down the round trip time from the loading unit to dump and carry more pay loads per hour.

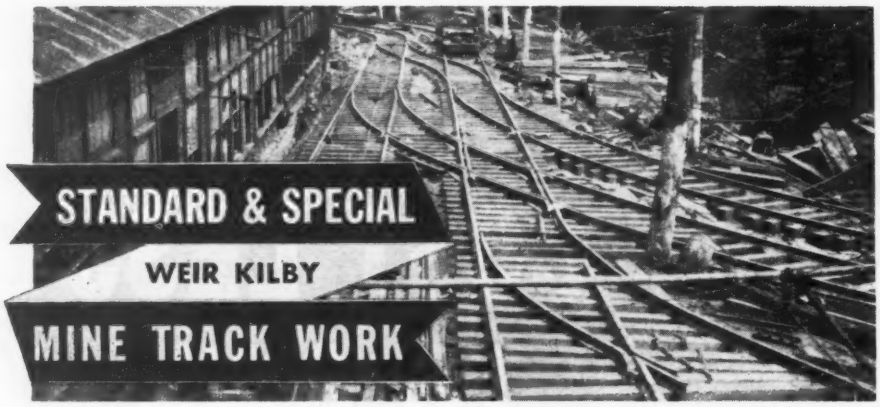
Designed and built throughout for the hard service of off-the-highway hauling, EUCLIDS actually cost less to own than ordinary hauling equipment. Lower operating and maintenance cost, plus dependable trouble-free operation, has made Euclid the favorite equipment of contractors and industrial users for hauling all kinds of heavy excavation and materials.

If you need new equipment for a current job or are planning for your peace time requirements, be sure to consult your Euclid distributor or write us for descriptive literature.

The EUCLID ROAD MACHINERY Co.
Cleveland 17, Ohio



EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH . . ROCK . . COAL . . ORE



STANDARD & SPECIAL

WEIR KILBY

MINE TRACK WORK

One of the surest ways to speed up coal production in these days of phenomenal demand, is to plan at once for the most efficient possible trackage, inside and outside the mine. Weir Kilby has developed many light weight and medium weight elements of track work especially for the mines.

We constantly carry in stock hundreds of mine turnouts, complete with Weir Titan Frogs, switch points, and stands in the standard angles and various rail sections, so as to facilitate immediate shipments. For other needs, your orders will be made up in the shortest possible time.

CATALOG "H" comprises 154 pages of helpful data, replete with photos, drawings and specifications, covers every track work need. Copy on request.

Suppliers to Mines and Railroads Since 1882

WEIR KILBY CORPORATION

CINCINNATI 12, O. BIRMINGHAM 7, ALA.

Build customer good-will now

BY DUSTPROOFING YOUR COAL WITH WYANDOTTE CALCIUM CHLORIDE

• Consumers and dealers like clean coal—coal that's free from dust and dirt and easy to handle. Now is the time to dustproof your coal with Wyandotte Calcium Chloride and build good-will that will serve you well when selling is again a problem.

• Wyandotte Calcium Chloride offers the safe economical and easy way to dustproof coal. A little goes a long way and gives it an attractive sheen that lets consumers know it's been specially treated.

• And when you use Wyandotte Calcium Chloride to dustproof your coal, you freezeproof it as well. In winter weather, this means lower handling costs, less degradation, better use of manpower and critically short railroad cars.

• Mail this coupon today for full information and literature about these uses of Wyandotte Calcium Chloride.

WYANDOTTE CHEMICALS CORP.
Michigan Alkali Division
Wyandotte, Michigan

Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

*Name*_____

*Address*_____

*Title*_____

Wyandotte CALCIUM CHLORIDE

REG. U. S. PAT. OFF.

WYANDOTTE CHEMICALS CORPORATION • Michigan Alkali Division

WYANDOTTE, MICHIGAN

are pledged to do all within our power to fulfill our obligation. But you, as a consumer of coal, may also help. The Solid Fuels Administration has said that the demand for coal this year may exceed production by 38,000,000 tons. If rationing and resultant hardship are to be avoided next winter, do your part by filling your coal bins now. You will in this way get cleaner and cheaper coal and you will be helping that much more in the war effort."

•

Coal Stokers to Heat Tobacco Barns

A new market for Class A coal stokers has been found in the heating of tobacco barns, where leaf tobacco is cured. According to stoker manufacturers, more than 1,000 stokers will be installed this year in such barns in Virginia and the Carolinas. These structures are about 20x20x20 ft. and are equipped with warm-air furnaces.

The curing starts at about 100 deg. and is stepped up until by the fourth day it reaches 180 deg. In the past, most of these furnaces were fired by wood, requiring constant attention and making exact regulation of temperature difficult. Oil burners, gravity type, have been installed in several thousand of these tobacco barns in recent years, but more recently, as electricity became available, coal-fired stokers, fired and controlled automatically, have entered this field and are said to operate at a considerable saving in cost of fuel and labor.

•

Coal Publications

Technical and Economic Study of Packaged Fuel, by V. F. Parry, U. S. Bureau of Mines. R. I. 3757, 59 pp.; mimeograph. Main troubles in plants are inadequacy in drying and in mixing of starch binder. Manufacturing cost ranged from $2.37 to $3.17 and left almost no profit when selling at lump-coal price. Ten pounds of starch binder serve for ton of packaged fuel.

Domestic Storage of Subbituminous Lump Coal and Its Performance in a Hand-Fired Furnace, by W. S. Landers and and V. F. Parry, U. S. Bureau of Mines. R. I. 3759, 22 pp.; mimeograph. "There is no good reason why subbituminous lump cannot be stored safely in homes." Stored in a closed bin, with rags under door to exclude air, no significant slacking or deterioration occurred, and no hazards were presented. Coal pile was 4½ ft. high and covered with wrapping paper secured by lumps of coal.

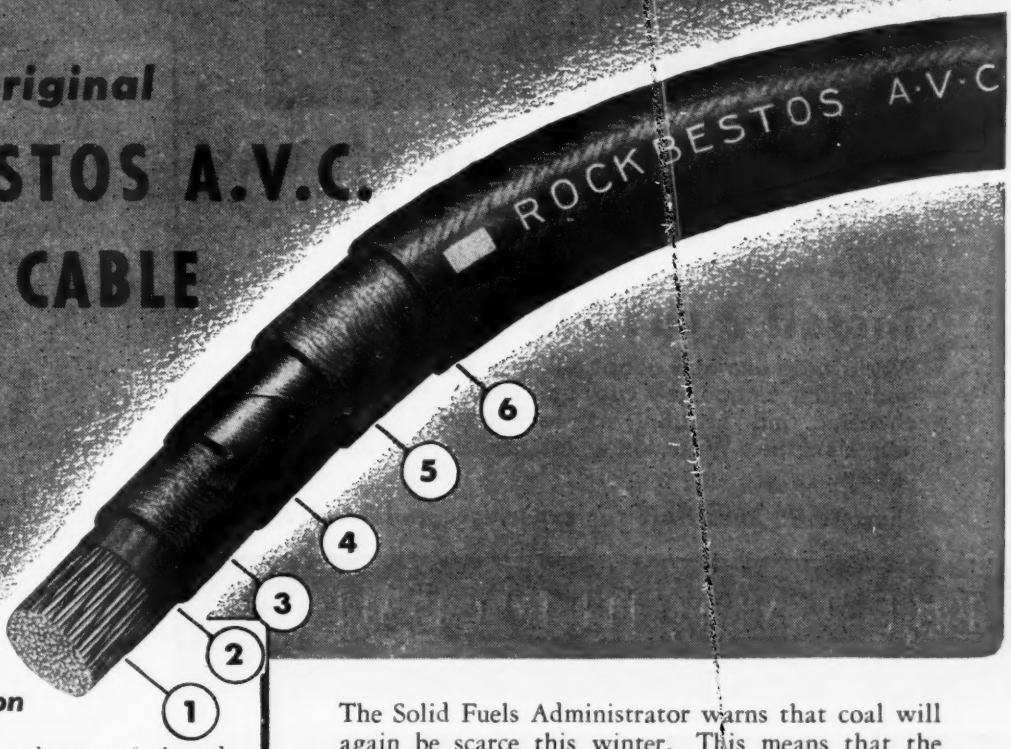
Work of the Survey of Carbonizing Properties of American Coals, by J. D. Davis and D. A. Reynolds, U. S. Bureau of Mines. R. I. 3760, 17 pp.; mimeograph. English studies show that the addition of fine anthracite up to 20 percent improves shatter indexes of coke. Blends of Pittsburgh-bed coal with anthracite increased size and 1½-in. shatter index of coke but decreased its 1-in. and ¼-in. tumbler indexes. Shatter 1½-in. index generally was improved by addition of breeze. Expansion, storage deterioration, compression of charge and coke from resinous coal were

For MORE Tonnage and LESS Outage

Wire Your Cutters, Loaders and Locomotives

with the Original

ROCKBESTOS A.V.C. MINING CABLE



The Original A.V.C. Construction

1. Flexible tinned copper conductor, perfectly and permanently centered in helically applied insulation.
2. Paper separator makes stripping easy; prevents insulation from sticking to conductor.
3. Impregnated heat, flame and moisture resistant felted asbestos insulation that withstands conductor-heating overloads and won't dry out, become hard and brittle, or burn.
4. Varnished cambric for high dielectric strength and added moisture resistance, protected from heat, flame and oxidation by two felted asbestos walls.
5. Outer felted asbestos wall which serves as an effective heat-barrier against high ambient temperatures.
6. Heatproof, fireproof asbestos braid, resistant to moisture, oil, grease and alkalies, is diametered to properly fit bushings.

For sizes and diameters refer to McGraw-Hill Coal Mining Catalogs or write to Rockbestos Products Corporation, P. O. Box 1102, New Haven 4, Conn.

122 different wires and cables have been developed for severe operating conditions by Rockbestos.

The Solid Fuels Administrator warns that coal will again be scarce this winter. This means that the internal wiring in cutters, loaders and locomotives must give continuous unfailing performance if equipment is to stay up at the face producing.

You can keep your mining equipment on the job by rewiring with Rockbestos A.V.C. Mining Cable. Used and recommended by leading equipment manufacturers and mine electricians for over 15 years, Rockbestos A.V.C. stands up under the severest operating conditions. Its tough, permanent *impregnated asbestos insulation* is heatproof and flameproof . . . resistant to moisture, oil, grease, gasoline and alkalies . . . and won't bake brittle, crack, dry out, bloom, swell or rot.

Keep your equipment running at top tonnage schedules . . . use Rockbestos A.V.C. Mining Cable for connections between controllers and resistors, coil connections and motor leads. Write for sample of cable and literature.

Rockbestos Products Corporation, 1102 Nicoll St., New Haven 4, Conn.

ROCKBESTOS A.V.C. *The Cable with Permanent Insulation*

ORDER FROM THESE JOBBERS—SPECIFY "ROCKBESTOS A.V.C."

BECKLEY, W. VA.:	Beckley Mach. & Elec. Co.	EVANSVILLE, IND.:	Evansville Elec.& Mfg. Co.	MIDDLESBORO, KY.:	Rogan & Rogan Co.
BIRMINGHAM, ALA.:	Moore-Handley Hdwe. Co.	FAIRMONT, W. VA.:	Fairmont Supply Co.	PITTSBURGH, PA.:	Upson-Walton Co.
BLUEFIELD, W. VA.:	Superior-Sterling Co.	HUNTINGTON, W. VA.:	Banks-Miller Supply Co.		Westinghouse Elec.Supply Co.
CLEVELAND, OHIO:	Upson-Walton Co.	LOTHAIR, KY.:	Mine Service Co.	SCRANTON, PA.:	Penn. Elec. Engineering Co.
				WILLIAMSON, W.VA.:	Williamson Supply Co.

FOR VICTORY — GET OUT COAL and INVEST IN U. S. WAR BONDS

studied, and results are recorded in this monograph.

The Burning Rate of Fuse, by D. Harrington and R. G. Warneke, U. S. Bureau of Mines. I. C. 7281, 10 pp.; mimeograph. Users of fuse should know its burning rate, which today is not a foot per minute, as generally accepted, but in most cases ranges from 1½ ft. to 2 ft. per minute.

Observations on the Use of Cyclohexylamine in Steam-Heating Systems, by A. A. Berk, U. S. Bureau of Mines. R. I. 3754, 46 pp.; mimeograph. Condensate is acidified by the carbon dioxide it contains and so corrodes pipes. Cyclohexylamine neutralizes the acidity but passes off with the steam and is lost in any condensate not returned to system. The amine appears also to inhibit corrosion.

Structural Features of Typical American Commercial Detonators, by R. L. Grant, U. S. Bureau of Mines. R. I. 3696, 35 pp.; mimeograph. Discusses bridge wires, ignition heads, ignition charges and types of seals.

Suggested Procedure for Conducting First-Aid and Mine-Rescue Contests, by G. W. Grove, U. S. Bureau of Mines; revision of T. P. 579 (1937). 92 pp., 4½x5¾ in.; paper; price, 15c. Superintendent of Documents, U. S. Government Printing Office.

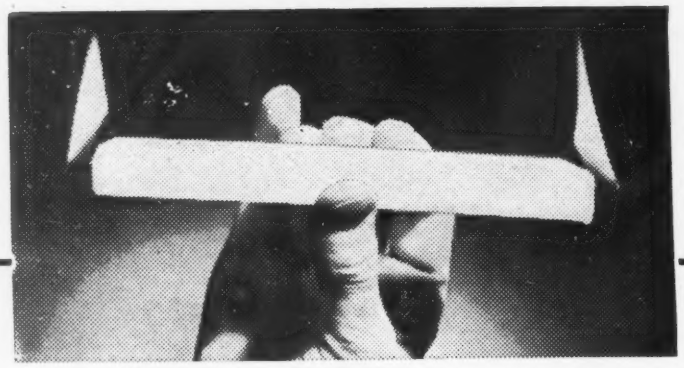
Precautions to Be Taken When Approaching Old Mine Workings, by D. Harrington and R. G. Warneke, U. S. Bureau of Mines. I. C. 7288, 20 pp.; mimeograph. Case presentation of accidents on approaching inactive and active operations in Pennsylvania, Arkansas, Colorado, Utah, Tennessee, West Virginia and Kentucky.

Timestudy Fundamentals for Foremen, by Phil Carroll, Jr.; McGraw-Hill Book Co., 172 pp., 4¾x7¼ in.; cloth; price, $1.75. Though directed at the machine-shop foreman and the establishment of the incentive wage, this book has suggestions of value to mine managers and foremen.

Materials Handbook. An Encyclopedia for Purchasing Agents, Engineers, Executives and Foremen, by George S. Brody. Fifth Edition; McGraw-Hill Book Co. 765 pp., 5¾x9⅛ in.; cloth; price, $5. So many metals, metal alloys, wetting agents, refractories, softeners, etc., enter into the operation of coal mines, furnaces, boilers and coke ovens that a reference guide to their character is greatly needed.

Calculus Refresher for Technical Men, by A. A. Klaf. McGraw-Hill Book Co. 431 pp., 5¼x8½ in.; cloth; price, $3. A book that gives questions and answers, beginning first with fundamentals and then with practical problems treated in the same catechetical manner.

Construction, Care and Use of Permissible Flame Safety Lamps, by A. B. Hooker, U. S. Bureau of Mines. Miners' Circular 44, 18 pp., 5⅞ x 9¼ in.; paper; price, 10c. Apply Superintendent of Documents, Washington 25. Describes among other matters the bimetal-helix for detecting low methane percentages, also list of suitable fuels, care of lamps, lamphouse tests, flame in air, firedamp and blackdamp, traveling flame, methane detection.



Stop The Needless Waste of 'Fines'

Production must go on, but waste of values can be stopped by the recovery of "fines" in coal and related industries.

Install AGITAIR Flotation

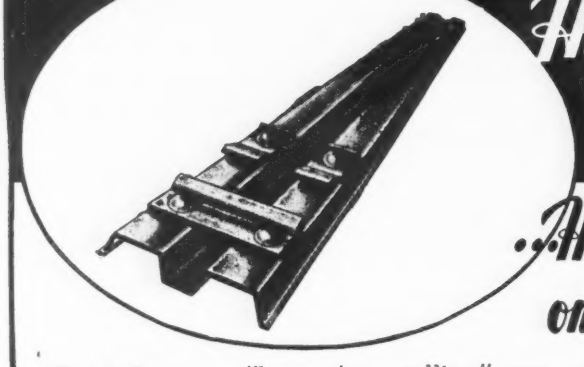
World-wide use and adaptability to varied products and plant capacities are impressive reasons for choosing and installing the famed AGITAIR Flotation Machine. Write today for profusely illustrated bulletin.

"There Is No Substitute for Experience and Service"

THE GALIGHER COMPANY

18 S. 2nd EAST ST. METALLURGICAL DIVISION SALT LAKE CITY, UTAH

Coal Production Depends on Haulage...



...Haulage depends on Good Track!

To help you "keep 'em rolling" we can assure PROMPT DELIVERY on a number of standard track equipment replacement parts—among them the Steel Tie shown above.

West Virginia Steel Ties embody all of the improvements in steel ties that twenty-two years of pioneering in tie design have developed. Note these advantages:

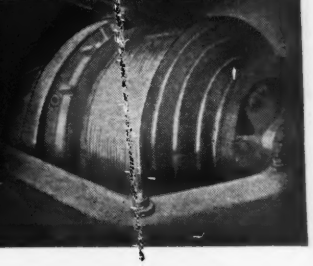
Rotary clips are self locking
Square shoulders on fixed clips hold rails to exact gage
Are compact and easily portable
May be used over and over many times
They are protected by a heavy coat of hot applied rust resisting paint
They are easily installed—just hammer the clips

WEST VIRGINIA STEEL & MFG. COMPANY

Formerly The West Virginia Rail Company

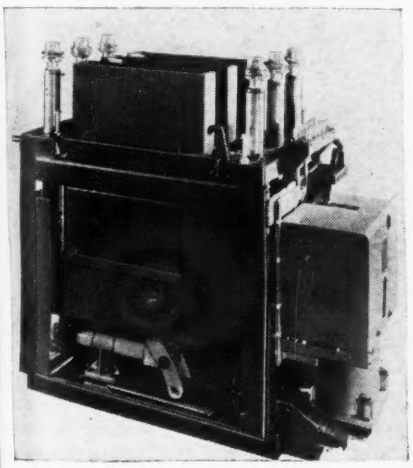
HUNTINGTON WEST VIRGINIA

TIPS FROM MANUFACTURERS



Air Circuit Breaker

Following the trend toward oil elimination in indoor switchgear equipment, a new "Ruptair" magnetic-type air circuit breaker has been developed by Allis-Chalmers Mfg. Co., Milwaukee, Wis., and is now available in high-voltage oil-less switch-gear rated 5,000 volts and below and 150,000 kva. interrupting capacity and below. The Ruptair breaker has over-all dimensions as compact as standard oil breaker switchgear, with all parts readily accessible, it is stated.



In the new unit, the arc chute has been carefully coordinated with the contact and the arc runner design to give consistent and reliable interruption through the entire range of current to be interrupted. The magnetic circuit, consisting of one husky blowout coil and two laminated iron pole pieces per phase, is arranged to force the arc up into the arc chute immediately upon separation of the arcing contacts.

Complete inspection and maintenance of the self-contained contact assembly can be accomplished without disturbing the arc chute or magnetic circuit in any way.

•

Metallizing Gun

Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y., has announced the introduction of the Metco Type 3E metallizing gun, especially designed for high-speed production spraying of low-melting-point metals. Using $\frac{1}{8}$-in. zinc, tin, lead, solder, babbitt, cadmium, or fine-gage copper and copper alloys, the gun exhibits spraying speeds which the manufacturer claims exceed any yet attained with these metals. Rates of disposition, in pounds per hour, include: zinc, 40; tin, 70; lead, 110; solder, 90; babbitt, 75.

Typical applications include corrosion-resistant coatings on iron and steel structures and equipment; water- and chemical-resistant linings for storage tanks and degreasers; conductive and soldering surfaces on glass, plastics, and carbon products.

•

Trucks

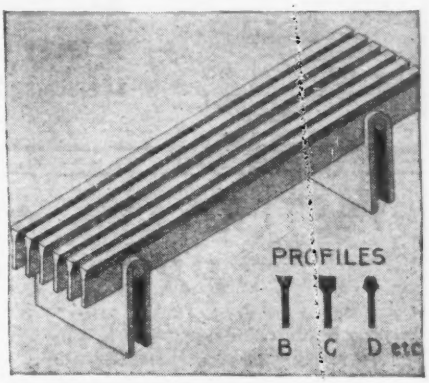
International models KR-11 (double-reduction drive) and KS-11 (two-speed rear axle) now in production are a part of the limited number of new trucks being built by International Harvester Co. under government order for essential civilian users who qualify for new vehicles under ODT priority. Transport of petroleum products is first on this priority list and then comes coal. Model KR-11 trucks have been especially in demand for hauling coal from strip mines. Equipped with 6- or 8-yd. dump bodies, the company states, they provide a low-cost, flexible means of hauling direct from the shovel, to breaker or cleaning plant.

Outstanding characteristics of the KR-11 and KS-11 models are said to be the great power and exceptional performance ability provided by the Red Diamond engine, which has 450.99-cu.in. piston displacement and develops 148 brake horsepower at 2,600 rpm. Maximum engine torque is 360 lb.ft. at 1,000 r.p.m. This engine is identical to the power plant of the International armored half-track combat vehicle built for the U. S. Army. Both models are available in three wheelbase lengths (149, 161 and 197 in.). Standard equipment includes air brakes and five-speed transmissions (overdrive or direct in fifth). Gross vehicle weight rating of both models is 27,000 lb.

•

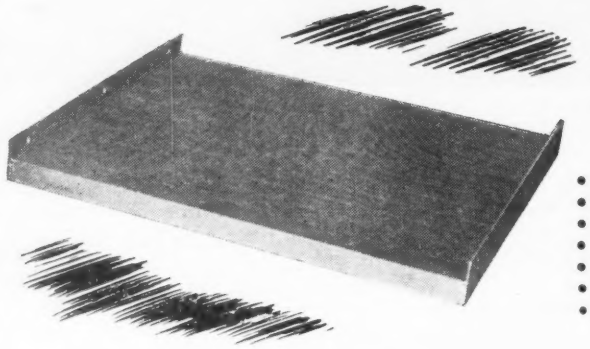
Screens

Wedge-Slot screens, offered by the Hendrick Mfg. Co., Carbondale, Pa., are recommended for many difficult applications in coal preparation such as dewatering, drying, classification, and recovery of fine material from silts and sludges. The continuous slots are said to reduce degradation from friable material. Made of wedge-shaped profile bars held in position by U-shaped holders, they receive required



FOR BETTER *Results* AND *Low Cost*

USE "BEE • ZEE" SCREENS



ALL TYPES SCREENS

- Chute & Conveyor
- Rigid Panel Vibrator
- Heat Dryer
- Hook-type Vibrator
- Shaker Panel
- Centrifugal Dryer
- Sizing Screen

Bixby-Zimmer round-rod screens are tailor-made in many designs for all sizing, dewatering and drying equipment. They're built for long life and efficient screening operation. Take advantage of "Bee-Zee" savings — call or write for information today.

BIXBY • ZIMMER
ENGINEERING CO.
961 Abingdon St. • GALESBURG, ILL.

YESTERDAY'S WASTE CAN BRING
PROFITS TODAY

At many modern coal mining operations, culm banks and waste piles are becoming a thing of the past, because Deister's development of the Plat-O Coal Washing Table has made it possible to reclaim sizes down to 1/16" x 0 — efficiently and profitably. One table handles 15 or more tons per hour . . . separation is automatic and always in full view . . . one man can take care of up to 20 tables.

If you are now writing off your sludge pond accumulations and picking belt rejects as "waste," Deister engineers can show you how to increase your production and profits with Plat-O Coal Washing Tables.

DEISTER MACHINE COMPANY, Ft. Wayne 4, Ind.

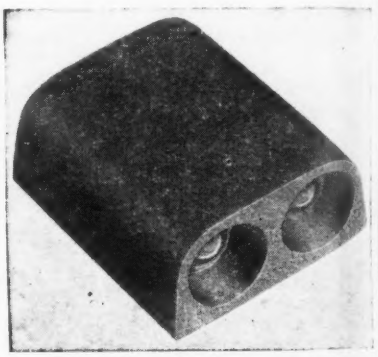
screen support by variations in U-support spacing and height; the U-supports furnish and maintain slot spacing by anchoring each profile bar in separate slots in the U-supports; the supports furnish and maintain screen rigidity by holding the rivets, which pass through each profile bar and are tightly held inside the curved top of the U-support.

Wedge-slot screens offer an uninterrupted slot for the entire screen length; the U-supports are well below the screen surface, with rounded tops to shed water and material. Uninterrupted slots, it is said, lower the percentage of breakage with friable material, improve drainage and prevent blinding from irregular-shaped material.

•

Switch Signal

Portable Lamp & Equipment Co., 420 Blvd. of Allies, Pittsburgh 19, Pa., offers a new throw lever switch signal designed to help reduce underground haulage road accidents. The new unit employs red

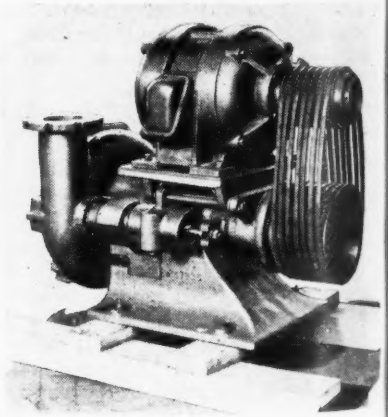


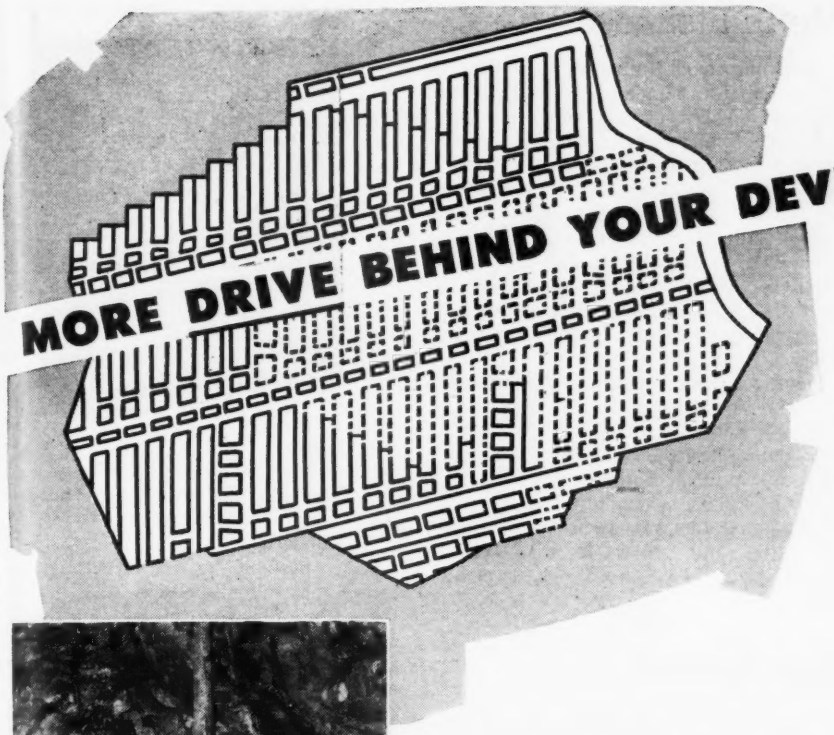
and white reflector buttons. When caught in the glare of locomotive headlights the reflector buttons indicate the position of the switch to the motorman. This simple safety device, designated as Cat. No. T-14-1 in the new portable track tackle booklet, is easily installed.

•

Centrifugal Pumps

Previously available with motor directly coupled to the impeller shaft or with V-belt pulley, flat pulley or sprocket on the shaft, Amsco-Nagle centrifugal pumps of the horizontal type, made by the Amer-



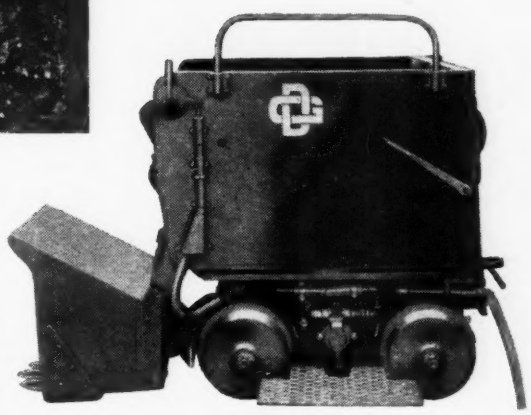


MORE DRIVE BEHIND YOUR DEVELOPMENT . . .

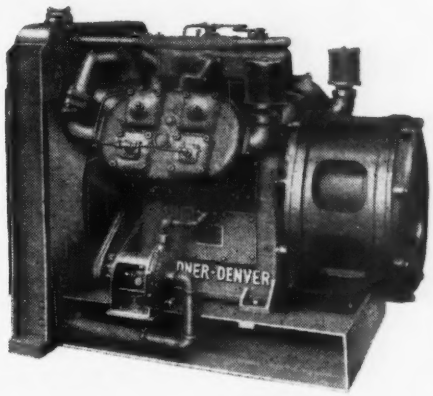
DRIVING haulage ways faster ...speeding slope sinking... advancing headings—Gardner-Denver deep-mining equipment puts more drive behind your development work.

The ability of Gardner-Denver Continuous Feed Drifting Drills to speed drilling—the efficient loading performance of Gardner-Denver Mine Car Loaders to get rock out in a hurry . . . eliminate unnecessary delays in getting at the coal. And, for a dependable source of compressed air to operate the drifters and loaders . . . for sand-blasting mine cars . . . in fact, for every coal mine need, there is the Gardner-Denver "WB" Water-Cooled Vertical Two-Stage Air Compressor.

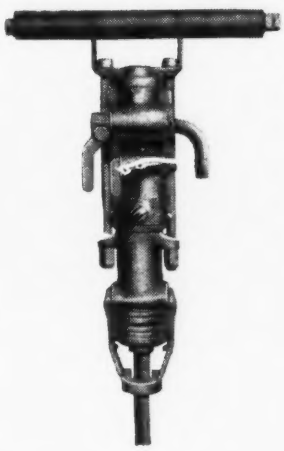
Because their built-in feed motor smothers vibration, Gardner-Denver CF 89H Continuous Feed Drifters assure less operator fatigue . . . permit faster job progress. Maintenance is extremely low.



With plenty of power to crowd into the pile and come up with a full dipper every time, Gardner-Denver Mine Car Loaders get rock out in a hurry. They speed up the entire drilling, blasting, loading cycle in a haulage way.



Large air output in a small compressor is assured by the Gardner-Denver "WB" Water-Cooled Vertical Two-Stage Compressor. Exceptionally compact, the "WB" can be moved from location to location.



Perfectly balanced for easy handling, Gardner-Denver S-33 Drills deliver a powerful blow that speeds rock or coal drilling. Weighs only 31 pounds.

For complete information on Gardner-Denver Mining Equipment, write Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER *Since 1859*

ican Manganese Steel Division of the American Brake Shoe Co., Chicago Heights, Ill., are now available with the motor mounted overhead.

This new arrangement offers the following advantages, according to the engineers responsible for its design: Pumps can be operated at more accurate speeds; speed changes can be provided where the duty calls for such changes; motor is stationed at a more accessible point and is at the same time protected against flooding. Also this arrangement requires less floor space for installation. The manufacturer's Type A and Type T pumps, both horizontal, are available with this motor mounting.

•

Coupling

Protection that secures operators against catching of clothing or incautious handling is said to be embodied in the new L-R Type C shrouded flexible coupling offered by Lovejoy Flexible Coupling Co., 5009 West Lake St., Chicago 44, Ill. The essential feature of this new protection is the outside steel collar that holds the load cushions in place. An extension of this collar that encircles the coupling safeguards materials and fingers from the heads of the bolts that secure the load cushion retainer. The boltheads are concealed yet easily and conveniently reached when necessity arises.

Metal Etcher

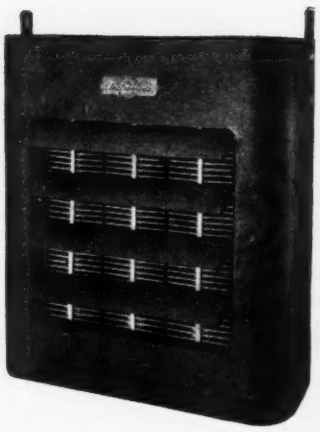
Anything made of iron, steel or its alloys, says the manufacturer, can be easily and quickly etched with the new "tool-room" metal etcher offered by the Ideal Commutator Dresser Co., 1013 Park Ave., Sycamore, Ill. It is said to be especially suitable for marking tools, gages, reamers, dies, punches, jigs, fixtures, etc., with numbers, sizes and other important information. The mark is burned right into the surface so that it cannot be worn off through ordinary usage.

Depth of mark is controlled by etching heat and speed of writing; four etching heats are 120, 240, 420 and 700 watts. Outstanding features include red indicating lamp, protected four-heat switch, removable hinged cover, terminal tap for 2-oz. etching tool (in addition to standard 4-oz.) and renewable work plate. Over-all size, $7\frac{1}{4} \times 5 \times \frac{1}{8} \times 8\frac{1}{2}$ in.; weight, 16 lb.

•

Unit Heaters

The 14 new standard electric unit heater models made by Electric Air Heater Co., Mishawaka, Ind., incorporate the patented one-piece finned aluminum elements used in the complete electromode line with recent refinements in inclosure and deflector designs. The maker says the elements consist of sheathed resistors cast in place



of aluminum, which has great thermal conductivity. No hot or incandescent wires are exposed.

Six models, 1.4 kw. to 7.5 kw., can be used as portable heaters or arranged for ceiling or wall suspension. Eight larger sizes, from 10 kw. to 60 wk., are for ceiling or wall suspension only. B.t.u. per hour range from 5,122 to 204,900. All heaters are furnished in black wrinkle enamel.

•

Gravity Feed Oiler

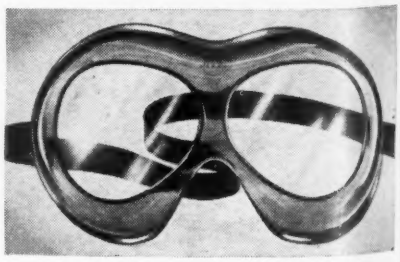
To the field of industrial lubrication, Oil-Rite Corp., 3491 South 13th St., Milwaukee 7, Wis., offers a new sight gravity feed oiler for reliable operation in strong construction and pleasing appearance. The rate of oil flow can be regulated with an adjustable needle valve by turning the knurled cap below the toggle switch. A locknut securely retains the desired setting. The shut-off lever on top of the oiler allows positive stopping of oil flow by throwing the lever to a horizontal position.

Oil supply always is visible through the heavy-walled unbreakable lucite reservoir. A self-closing filler cap may readily be opened with an oil-can spout for filling the reservoir. The bottom of the reservoir is designed so that dirt and other foreign matter will have a tendency to settle on a surface lower than the oil intake port leading to the needle valve, thus reducing the possibility of entering into the machine. Oil-Rite gravity feed lubricators are available in nine sizes with capacities ranging from $\frac{3}{8}$ to 36 oz.

•

Lightweight Goggle

A new contender in the lightweight field of goggles is an all-plastic safety development of the Chicago Eye Shield Co., Chicago. The combined weight of the plastic frame and lenses is 96/100 oz., but the new goggle is said to provide



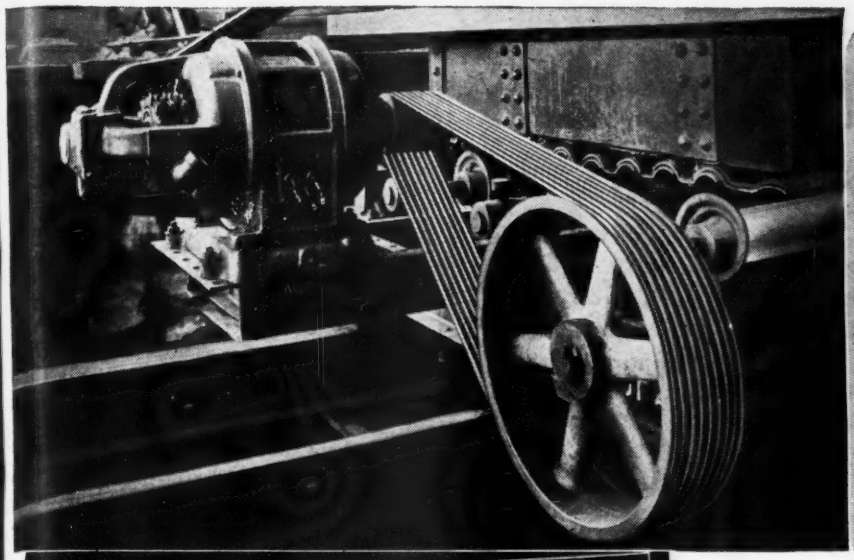
5 reasons why AMERICAN BRATTICE CLOTH is the logical choice for your operations

- It is impervious to flame, fungi and shrinkage.
- It is closely woven, of highest grade materials, to reduce air leakage to a minimum.
- The surface is smooth . . . not easily damaged by passing cars or machinery.
- It may be moved many times . . . used over and over.
- It is easy to install, and once installed requires no maintenance.

Write today for complete information on AMERICAN Brattice Cloth.

Our large factory stocks enable us to make prompt deliveries on your orders.

THE AMERICAN BRATTICE CLOTH CORPORATION
WARSAW · INDIANA



Wood's

V-BELT DRIVES

. . . ARE ENGINEERED FOR *EFFICIENT* POWER TRANSMISSION

Bringing together low speed machinery and high speed motors . . . transmitting power from its primary source to the driven machinery . . . presents a problem which can be solved effectively, with minimum loss, through the agency of V-Belt Drive.

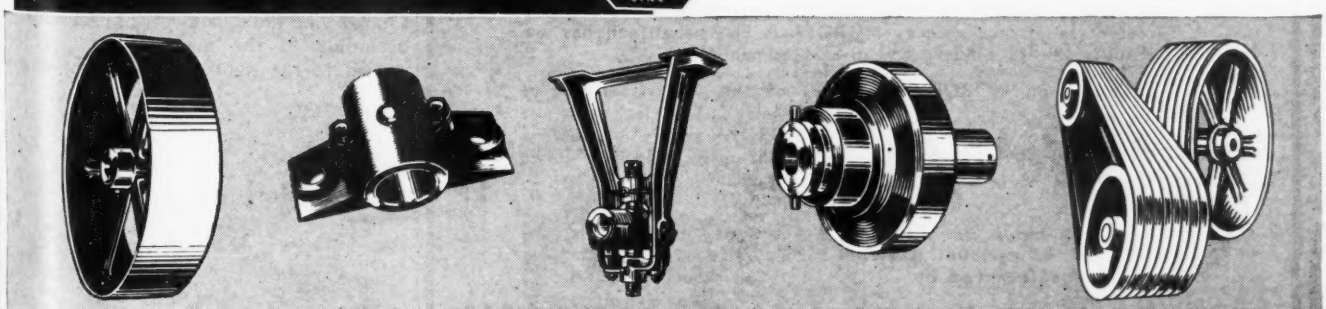
Flexible and resilient, full-molded belts in conjunction with Wood's sheaves, having precisely machined, accurately spaced, perfectly designed grooves, produce a highly efficient drive . . . the V-Belt power transmission at its maximum performance.

The benefit of Wood's pioneering experience . . . 87 years service to American industry in war and peace . . . can be yours. Wood's warehouses are adequately stocked with an assortment of sheave sizes and standard V-Belts from which we can usually take care of your needs. Special features including extra weight sheaves for fly wheel effect, bolting flanges, etc., to suit customers' requirements can be made from Wood's flexible patterns at our factory at no extra expense.

Send for our 64-page V-Belt catalog. It fully describes Wood's V-Belt Drives . . . no obligation.

EVERYTHING IN TRANSMISSION

Bearings—Collars—Clutches—Couplings—Contactors —Hangers—Pillow Blocks—Pulleys—V-Belt Sheaves and Complete Drives



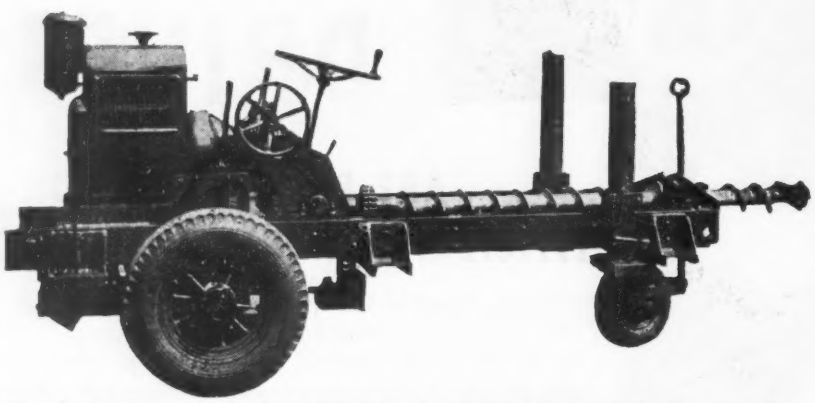
T. B. WOOD'S SONS COMPANY, CHAMBERSBURG, PENNA.

BRANCHES: 307-391 ATLANTIC AVE., BOSTON, MASS. • 83 PLANE ST., NEWARK, N. J. • 425 FIRST AVE., PITTSBURGH, PA.

PARMANCO Horizontal Drills

"Positive Control Drilling"

Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling—All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators—Write us your drilling problems.



PARIS MANUFACTURING CO.

PARIS, ILLINOIS

One-half of air pumped never reaches the face — You can better that percentage at your mine with—

Try the "Blow-Torch Test"

MOROPA

COTTON BRATTICE CLOTH

This is no time to risk production losses through faulty ventilation . . . . MOROPA COTTON BRATTICE CLOTH, as proved in the mines of many leading producers, is the soundest choice for the safety that allows you to boost vital production.

A careful examination of MOROPA'S characteristics reveals the reasons for its acceptance. MOROPA is Flame-Resistant, has low Porosity, Resists Mildew, and gives Maximum Wear.

See data on MOROPA, page 123 of the 1943 Coal Mining Catalog . . . or write us! MOROPA comes in standard widths up to 84 inches. Other sizes special.

Moropa

. . . . made in America, of American Cotton, manufactured by . . . .

Act today to eliminate unnecessary ventilation risks . . . . install MOROPA.

JOHN FLOCKER & COMPANY

642 GRANT ST. EST. 1822 PITTSBURGH, PA.

full protection against impact while affording a high degree of wearing comfort.

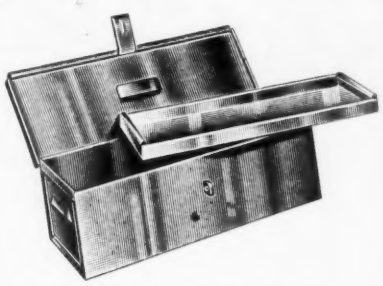
"This new Cover-Lite model," declares Fred Guilbert, sales manager, "we sincerely believe, will help solve eye-injury problems because it provides good protection and is so comfortable to wear. It rests lightly on the brow, with no pressure at any point. It is suited for women or men workers, is designed to fit varying facial widths and may be worn directly over prescription glasses. Air space eliminates fogging, while the strong plastic frame not only protects the entire eye area but also shields against distracting reflections and eyestrain."

Interchangeable lenses may be replaced at small cost. Replacement is simple—just snap out the old lens and snap in the new.

•

Tool Box

Individual tool storage, protection and transportation are said to be completely satisfied through the use of a tool box developed by Lyon Metal Products, Inc., Aurora, Ill. The box features completely welded construction; full-length, piano-type hinge that prevents top from

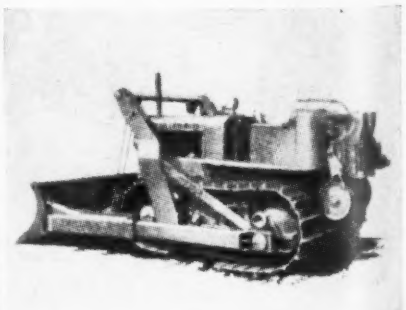


twisting out of line; a strong carrying handle; optional tray for smaller items, and strong padlock attachment that guards against petty thievery. The box is furnished in durable green baked enamel that assures long life under adverse conditions.

•

Tilt Dozer

A new cable-controlled side-lift Bulldozer and trailbuilder featuring single kingpin mounting of the moldboard and double trunnion tilting is offered by the Buckeye Traction Ditcher Co., Findlay, Ohio. The moldboard of the trailbuilder, according to the manufacturer, can be angled to the right or left on the single



EVERY LENGTH OF WIRE ROPE NOW IN SERVICE IS VITAL TO WINNING THE WAR

Keep yours fit and working for the duration

Wire rope serves constantly on all fronts: in mines and quarries . . . oil-fields and timberlands...mills and shipyards...at the docks—hoisting, pulling, moving materials for production . . . loading, shipping, delivering fighting tools to our fighting men. And every length in service now must last longer than ever before.

Make your wire rope last . . . by extra care . . . by guarding its life . . . for wire rope is the lifeline to victory. Your regular source of supply is ready to give you helpful information on how to make your wire rope last longer . . . how to get maximum ton-miles of service from your rope in service.

HOW TO MAKE YOUR WIRE ROPE LAST LONGER

1. Select the right rope for the job *by getting proper construction; right size; right lay; full allowance for safety factor.*
2. Install wire rope properly *by unreeling it correctly; winding on drum properly; not allowing rope to kink; fixing clamps properly; reeving rope through sheaves and blocks carefully; seizing rope-ends thoroughly.*
3. Be diligent in maintenance of your wire rope *by inspecting it regularly and carefully; inspecting sheaves and bearings often and thoroughly; checking lubricant frequently; cleaning rope regularly; avoiding impact or shock loads.*

JONES & LAUGHLIN STEEL CORPORATION

WIRE ROPE DIVISION

PITTSBURGH AND MUNCY, PENNSYLVANIA

MOSEBACH ELECTRIC & SUPPLY COMPANY . . . . . PITTSBURGH 3, PENNA.

Specify MESCOWELD RAIL BONDS...
For Maximum Cable Conductivity!
manufactured by the
Patented Flashweld Process
Choice of 18 Styles

★ Flashwelding provides an absolute connection between the end of each wire in the copper cable and the forged steel terminal, resulting in greater strength and minimum power loss.

Investigate!

WRITE for CATALOG No. 44

kingpin by removing two landside pins, swinging the blade to the desired side, and replacing the landside pins which hold it rigidly in place. The double trunnion mounting makes it possible to tilt either end of the blade 12 in. by attaching one push arm to the top trunnion on one side while the other arm is mounted on the lower trunnion on the opposite side.

The horn and push frame are fabricated from heavy steel welded box beams. The powerful construction of the moldboard is another notable feature. Welded V-shaped vertical braces and heavy steel-plate horizontal crosspieces reinforce the blade. Moldboard is fitted with reversible cutting edge and replaceable corner bits. The new dozer is track-mounted with the weight evenly distributed over the crawler shoes. Single- or double-drum Buckeye power-control units provide the necessary power.

•

Industrial Notes

BETHLEHEM STEEL CO., Bethlehem, Pa., has elected H. H. Fuller as vice president in charge of West Coast steel activities, effective July 1. He succeeds W. H. Stewart, who has held the office for the last twelve years. Mr. Stewart will continue in an advisory and consulting capacity. C. M. Mackall will succeed Mr. Fuller as manager of sales, New York district. Mr. Mackall goes to New York from Pittsburgh, Pa., where he was general manager of central sales. Bennett C. Macgregor, formerly manager of sales, St. Louis district, will succeed Mr. Mackall as general manager of central sales. C. H. Cecil has been named to succeed Mr. Macgregor as manager of sales at St. Louis, going to this position from the sales force in the Chicago district.

NORMA-HOFFMANN BEARINGS CORP., Stamford, Conn., has elected D. E. Batesole as vice president and chief engineer. He has been a member of the firm's engineering department for more than 25 years and has been chief engineer since 1937. Frederick W. Mesinger, for the last 16 years district manager in the New York office, has been elected a vice president, succeeding H. J. Ritter, resigned. Robert L. Miller, assistant sales manager, has been named Eastern sales manager; Carl W. Hedler, assistant sales manager, has been made Western sales manager, continuing his former duties in charge of distributor sales. Messrs. Miller and Hedler, both of whom have been with the organization for many years, will report to Mr. Mesinger.

ELECTRIC STORAGE BATTERY CO., Philadelphia 32, Pa., announces that F. F. Sampson, manager, New York branch, retired July 1 after 30 years of service. Daniel P. Orcutt, assistant manager since 1921, succeeds Mr. Sampson. A graduate of Denison and Cornell universities, Mr. Orcutt joined the company in 1910.

R. G. LETOURNEAU, INC., Peoria, Ill., has named Gordon S. McKenty as general sales manager to succeed Ed R. Galvin, who resigned to accept the presidency and

BELTS STAY JOINED
because
staggered points prevent
single-line strain

With Bristol's Staggered Point Lacing on your belts — any kind — you get double security . . . because staggered points enter in a double row. You also get application ease that can't be beat . . . as simple as hammering nails. In fact all the equipment you need is a hammer and a block of wood. Just the thing in an emergency. Write for Bulletin 728A.

NOTE UNIQUE SHAPE OF RIVET HOLE.
PRONGS OF RIVET CAN GO INTO HOLE ONLY IN ONE WAY-PARALLEL TO BELT FIBRES
740 BRISTOL'S
DIRECTION OF BELT MOTION
SHOWING TAPERING RIVET POINTS
METAL IS SHEARED OFF THE SHANK AS THE RIVET IS BEING DRIVEN HOME INTO RIVET HOLE. THIS RESULTS IN TIGHT FIT AND PREVENTS RIVET FROM WORKING LOOSE.

Also available are Bristol's Steel Belt Plates with matching rivets for conveyer, elevator and transmission belting. Also easily applied with a hammer. A wide assortment for all shapes of pulleys. Bulletin 729 gives specifications.

THE BRISTOL COMPANY
139 Bristol Road, Waterbury 91, Conn.

COPR. 1944 MACK MFG. CORP.

GOOD IDEA . . . FROM AWAY BACK . . .

It isn't hard to build a truck. But it's mighty hard to build a truck to match a Mack! And there's a reason. Back in 1900, John Mack set out to build the best truck in the world. His very first Mack stayed in service 17 years. Today we go forward with his same idea—backed by all we learned along the way. Big or little—heavy or light—no matter what type of Mack you own, you can be sure you'll get your money's worth in *work*. That's what "Built like a Mack truck" means. And the record says it means it *more* with every passing year.

Mack Trucks, Inc., Empire State Building, New York, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J. Factory branches and dealers in all principal cities for service and parts.

Mack

TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY . . . IF YOU PLAN TO GET ONE, YOU'RE WISE!

THAT YOU'LL EVER SEE A STOKER THAT WILL SWALLOW IRON

BUT there is no doubt that there is no more effective and economical means of removing iron from stoker coal than with Dings High Intensity Magnetic Separators.

1. MAGNETIC PULLEYS—Installed as head pulleys in belt conveyors. Completely automatic. Most powerful in the market size for size. Catalog 250.

2. SPOUT MAGNETS—Installed in chutes. Automatic or semi-automatic models. Catalog 301.

3. MAGNETIC DRUMS—Installed below chutes. Fully automatic. (See illustration below). Catalog 660.

4. SUSPENSION MAGNETS—Installed above belt conveyors. Original Dings rectangular design. Catalog 301.

FOR literature, recommendations, price quotations, write today.

DINGS MAGNETIC SEPARATOR CO.

506 E. Smith St., Milwaukee 7, Wisconsin

World's Largest Exclusive Builders of Magnetic Equipment. Est. 1899.

Dings MAGNETIC SEPARATION HIGH INTENSITY

LIEUT. FRANK IRWIN

First pilot on a B-17, U. S. Army Air Force, Lieut. Irwin is now doing his stuff along the robot coast of France, having flown his ship and crew over early in June. He was the first employee of the Tamping Bag Co., Mt. Vernon, Ill., rising from office boy to warehouse manager and serving as acting boss during the absence of the real boss.

---

a directorship of the Tyson Bearing Corp., Massillon, Ohio. Mr. McKenty joined LeTourneau in 1935 as a district sales representative.

ALLEN-SHERMAN-HOFF CO., Philadelphia, Pa., has engaged William Hogan as Hydroseal pump engineer to cover the southeastern states. He formerly was associated with the Georgia Iron Works. J. C. Tyger, formerly with the Pomona Pump Division, Joshua Hendy Iron Works, is now Hydroseal pump engineer for the mid-western states, with headquarters at 407 South Dearborn St., Chicago.

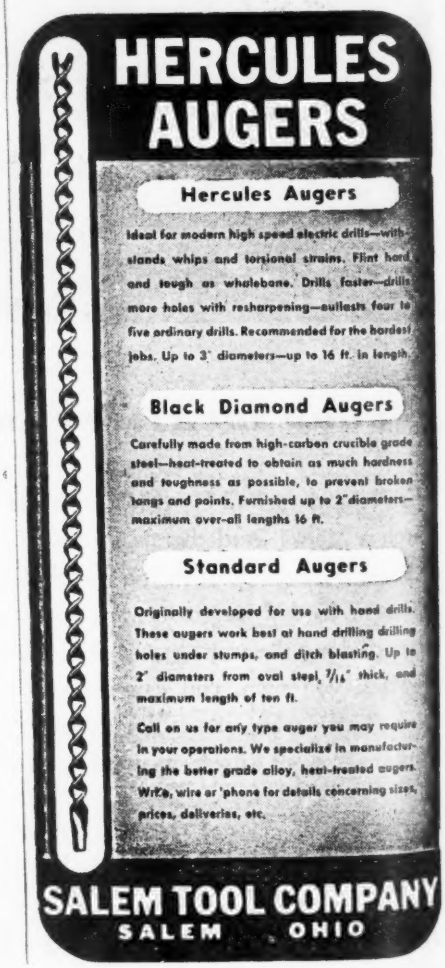
PHILCO CORP., Philadelphia, has elected William Balderston, formerly vice president in charge of the commercial division, to the position of vice president in charge of operations and membership on the executive committee. William E. Kress has been named sales manager for the Middle West with headquarters in Chicago. He succeeds John M. Otter, who was named sales manager for the home radio division.

ATHEY TRUSS WHEEL CO., Chicago, has elected B. F. Lease, sales manager, as vice president in charge of sales, advertising and service.

AMERICAN HOIST & DERRICK CO., Plant No. 2, South Kearny, N. J., is the new name of the American-Terry Derrick Co.

NATIONAL BATTERY CO., St. Paul, Minn., has appointed George S. Tanner as manager of equipment sales. He has been with the company 18 years.

MANNING, MAXWELL & MOORE has ap-


HERCULES AUGERS
Hercules Augers
Ideal for modern high speed electric drills—withstands whips and torsional strains. Flint hard and tough as whalebone. Drills faster—drills more holes with resharpening—outlasts four to five ordinary drills. Recommended for the hardest jobs. Up to 3" diameters—up to 16 ft. in length.
Black Diamond Augers
Carefully made from high-carbon crucible grade steel—heat-treated to obtain as much hardness and toughness as possible, to prevent broken lungs and points. Furnished up to 2" diameters—maximum over-all lengths 16 ft.
Standard Augers
Originally developed for use with hand drills. These augers work best at hand drilling drilling holes under stumps, and ditch blasting. Up to 2" diameters from oval steel, 7/16" thick, and maximum length of ten ft.
Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or 'phone for details concerning sizes, prices, deliveries, etc.
SALEM TOOL COMPANY
SALEM OHIO

Strip it Faster

OPEN UP LARGER PITS . . . EASIER . . . MORE ECONOMICALLY WITH LAPLANT-CHOATE

"Carrimor" Scrapers

Think of all the time and money you can save by handling your stripping operations with tractor-drawn scrapers that dig, haul and spread their own loads. For example, by using LaPlant-Choate "Carrimor" scrapers in combination with "Caterpillar" diesel tractors, you can open up larger pits . . . get down to "pay dirt" faster with fewer men . . . and eliminate costly rehandling of overburden. In many areas adaptable to scraper operation, this job-proved method is already producing amazing results. That's why it's good business to get complete facts from your LaPlant-Choate "Caterpillar" distributor now—so you'll be all set for profitable action when new tractor-scraper equipment is again available. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Ia.

A TIMELY SUGGESTION

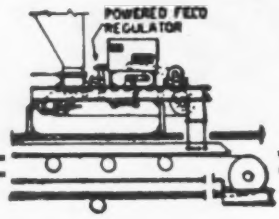
For years, successful mine operators in all parts of the world have been using dependable LaPlant-Choate dozers and scrapers for stripping overburden . . . clearing new sites . . . building roads . . . cleaning up around shovels . . . handling waste . . . and literally scores of other utility jobs formerly done by hand labor. Thanks to important war-time improvements, tomorrow's LaPlant-Choate dozers and scrapers will be able to handle your jobs even faster, cheaper, better than ever before. In the meantime, we suggest that you utilize the experienced services of your LaPlant-Choate "Caterpillar" distributor—to keep your present equipment rolling as long and as efficiently as possible.

ARMY E ★★ NAVY

LaPLANT-CHOATE

Earthmoving and Land Clearing Equipment

MERRICK



FEEDOWEIGHT

Accurately Feeds and Records by Weight

Look into this method of feeding coal to a mixing conveyor.

A powered feed regulator controls the feed gate. A visible balance indicator shows true balance for correct rate of feed, while the weight totalizer keeps an accurate record of the day's tonnage.

Investigate this sturdy, dependable equipment for controlling and recording by weight.

Write for Bulletin 551.

Merrick Scale Mfg. Co.

Passaic, N. J.

QUALITY MARLO PACKING

METALLIC & SEMI-METALLIC

PACKING

for

MINE PUMPS

"The Packing that gets the Repeat Orders"

For deep mine pumps. Resists acid mine waters. Keeps grit out of stuffing box. Three types.

• MARLO ALL PURPOSE METALLIC PACKING

Best ever devised. Will not freeze at 70° below. Soft, pliant, like fibrous types, yet easier to handle. Won't cut, score or corrode moving parts.

• "TWIN-TWIST" SEMI-METALLIC PACKING

Metal strands twisted with asbestos. Anti-frictional. Durable. Economical. Remarkable compressability. Never hardens. For temperature up to 550° F.

• "RED WATER" SEMI-METALLIC PACKING

Most modern development for all hydraulic applications. A solid-packing vegetable fibre combined with metal strands. Retains form under any conditions.

Let us serve you!

THE MARLO COMPANY

38 HOWARD ST.

NEW YORK, N. Y., U. S. A.

pointed Robert Holmes & Bros., Inc., Danville, Ill., as stocking distributor for Hancock bronze and steel valves, Consolidated valves, Duragauges, Ashcroft gages, American thermometers and American industrial instruments.

Wickwire Spencer Steel Co., 500 Fifth Ave., New York 18, N. Y., has purchased the business and assets of the Sirian Wire & Contact Co., Newark, N. J., and will immediately assume full control of its management and production operations. A new subsidiary, Wickwire Spencer Metallurgical Corp., has been formed, with these officers: president, E. P. Holder; executive vice president, Lt. Col. Cecil P. Young, retired; treasurer, George H. Creveling; secretary, Franklin Berwin. L. D. Granger also will be connected with the new organization, with offices at 260 Sherman Ave., Newark 5, N. J.

Phillips Mill & Supply Co., Pittsburgh, Pa., has appointed P. T. Keebler as plant manager of the company's industrial car division. He replaces R. R. Phillips, recently commissioned a lieutenant (j.g.) in the Navy.

General Electric Co., Schenectady, N. Y., has named K. R. Van Tassel as manager of its industrial control division. He succeeds George R. Prout, recently appointed manager of the company's air-conditioning and refrigeration division. Elliott Harrington has been appointed manager of sales of its new integrated-horsepower alternating-current motor section in Schenectady. J. T. Farrell has been named manager of sales of the direct-current section. D. A. Yates has been appointed assistant manager of sales of both sections in charge of Lynn motor sales group and will be stationed at the Lynn (Mass.) River works.

Electro Metallurgical Co., Electro Metallurgical Co. of Canada, Ltd.; Michigan Northern Power Co. and Union Carbide Co. of Canada, Ltd., units of Carbide & Carbon Corp., have elected William J. Priestley as president, succeeding the late Francis P. Gormley.

Gene H. Edwards, Latrobe, Pa., has joined the National Powder Co. as a special representative of the sales department. The company has opened a branch office in the First National Bank Building, Latrobe, with P. T. Rogers as manager.

Mack Trucks, Inc., announces the return of M. C. Horine as sales promotion manager following his resignation from the War Production Board. He joined the Mack organization as an engineer in 1918. In the Northeastern division, E. W. Turnbull, formerly assistant division manager, takes over the Akron branch as district manager, while E. W. Atherton, formerly manager in Akron, assumes the duties of district manager in the Albany branch. In the Southern division, J. A. Bascle, formerly a marine engine salesman for Mack, is district manager of the New Orleans branch.

Federal Electric Products Co., Newark, N. J., has purchased the electrical division of Colt's Patent Firearms Mfg. Co., Hartford, Conn. To the Federal

FOR SAFETY'S SAKE, SUPERIOR COUPLINGS

Drop Forged Links

Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

DROP FORGED SWIVEL COUPLINGS

PITTSBURGH KNIFE & FORGE CO.

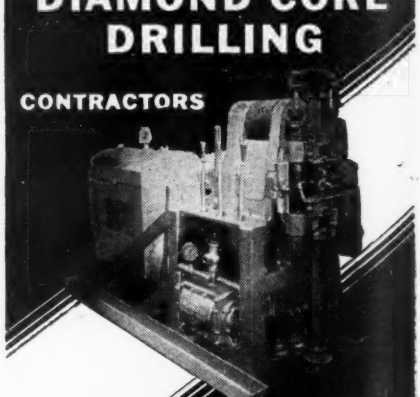
716 Chateau Street

N. S., Pittsburgh, Pa.

MOTT

DIAMOND CORE DRILLING

CONTRACTORS



Mott Type "A" Oil Hydraulic 1500 Ft. Cap., 2¾" Diameter Core.

• Coal and all mineral properties tested—using our light gasoline drills. They save fuel and moving costs . . . guarantee satisfactory and proper cores.

Pre-pressure grouting for mine shafts, ground solidification for wet mine areas by our stop grout method. Water wells and discharge holes drilled and grouted . . . electric drills for inside mine drilling.

MOTT CORE DRILLING CO.

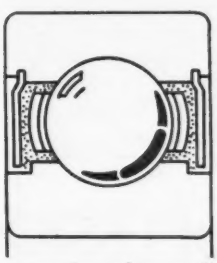
HUNTINGTON • WEST VIRGINIA

DAM THE DIRT!

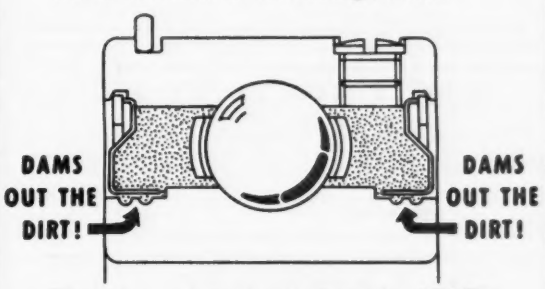
Dirt is the curse of every user of motors and machines. In shop and factory it gets into the average bearing, where it destroys the high finish, abrades the polished surfaces, creates friction that results in vibration, looseness and noise. And its action is cumulative—once started, it leads to premature bearing failure.

In the NORMA-HOFFMANN "CARTRIDGE" BALL BEARING, wearless metal seals combine with "labyrinth" grease grooves to form a highly effective barrier that dams out dirt—at the same time preventing the escape of the lubricant packed in the extra large grease reservoir afforded by the double-row width of the bearing. As a result, the initial high anti-friction efficiency of the "CARTRIDGE" BEARING is maintained over extremely long periods.

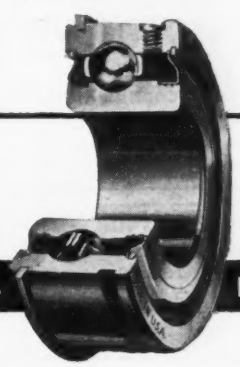
NOTE:—Many representative motor, machine and tool builders are incorporating the "CARTRIDGE" BEARING in their products. When you buy such units, ask for the NORMA-HOFFMANN "CARTRIDGE" BALL BEARING.



This shows a section of an ordinary single-row "shielded" ball bearing, with its space restrictions limiting the grease capacity and the effectiveness of the sealing devices.



Here, in contrast, note how the "CARTRIDGE" BEARING double-row width not only affords at least 100% larger grease capacity than the ordinary single-row "shielded" bearing, but also permits the use of a highly effective and wearless seal.



NORMA-HOFFMANN

"CARTRIDGE"

BALL BEARING

NORMA-HOFFMANN BEARINGS CORPORATION, STAMFORD, CONN. FOUNDED 1911

TO WIN THE WAR: WORK—FIGHT—BUY WAR SAVINGS BONDS!

products covering safety switches, panelboards and circuit breakers will be added the Colt group of service equipment and load centers, multi-breakers, motor starters and overload relays.

TIMBER ENGINEERING CO., INC., Washington, D. C., has opened a San Francisco service and sales office. Alden K. Smith has been appointed service and sales manager for the Pacific Coast States. He was employed in the headquarters office until two years ago, when he was transferred to Portland to open a branch office in the Northwest. A complete line of Teco connectors and grooving tools will be warehoused in San Francisco as well as in Portland.

•

Trade Literature

COAL STORAGE—Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin Form MS 809-446 describes a fast, flexible tractor-scraper and bulldozer installation for safe and economical storage and handling of coal. To eliminate the fire hazard, the coal is stored horizontally instead of in conical piles, track-type tractors being employed to haul the coal into storage by self-loading scrapers, or when only short distances are involved the bulldozer is employed. In addition to supplying the power for transportation of the coal the tractor also serves to compact it, preventing spontaneous combustion.

WELD PROCESS—Metallizing Co. of America, 1330 West Congress St., Chicago 7, Ill. Bulletin gives complete information on the new Mogul "Nervous Weld" process for salvaging defective aluminum, bronze, gray iron, malleable and steel castings. It also describes the new Mogul "Nervous Weld" pistol and machine for plugging holes, building up shrinkage fissures, changing the contours on molds and building up dimensional surfaces on parts that have not cleared up properly.

SCREENS—Hendrick Mfg. Co., Carbondale, Pa. Bulletin describes Wedge-Slot screens for many difficult applications in coal preparation such as dewatering, drying, classification, and recovery of fine material from silts and sludges.

CENTRALIZED LUBRICATION — Farval Corp., 3295 East 80th St., Cleveland 4, Ohio. Bulletin 25 tells how centralized lubrication systems increase production output of machinery and at the same time make impressive savings in time, power and lubricating materials. The booklet gives a study of the machinery lubrication problem and of economies inherent in a system that delivers lubricant to all bearings in exact measured quantities regardless of location. There also is an explanation of how the Farval measuring valve operates to deliver a measured quantity of lubricant without recourse to springs, check valves or small ports. The construction and operation of both manual and autoatic pumping units which provide the high-pressure source of lubricant supply also are treated.

TRUCK TIRES—B. F. Goodrich Co., Akron, Ohio. Booklet contains analysis of the truck tire situation now and in the immediate future as well as a candid discussion of the quality and service of synthetic truck tires, being a reprint of an address given by J. E. Powers, manager, truck and bus tire department, B. F. Goodrich Co., before the Pennsylvania Motor Truck Association.

MINING EQUIPMENT—Robert Holmes & Bros., Inc., Danville, Ill. Bulletin describes a variety of equipment designed for modern mining, including replacement parts.

V-BELT DRIVES—B. F. Goodrich Co., Akron, Ohio. Handbook on industrial fractional horsepower V-belt drives notes the trend toward larger sheaves in both fractional horsepower and multiple V-belt drives, describes the construction of Goodrich fractional horsepower V-belts and gives prices and data on both sheaves and belts. There is a chapter on proper selection of f.h.p. belt drives, with formulas, together with a page on how to get the most service from V-belt drives. Horsepower ratings and general engineering data on these drives are given, together with selection tables of stock drives using pressed-steel and cast-iron f.h.p. single-groove sheaves and adjustable cast-iron single-groove sheaves.

THERMAL AND BOTTLE OILERS—Trico Fuse Mfg. Co., Milwaukee, Wis. Bulletin 28-A illustrates and describes a modernized streamlined thermal oiler with plastic reinforced reservoir that automatically supplies the proper quantity of oil for solid, wick- and waste-packed bearings where only a small quantity of oil is required; available in 1- and 2-oz. capacities. The bottle oiler style has a vibrating rod which, on the slightest vibration or vertical movement, releases oil to the bearing; available in 2- and 4-oz. capacities.

REDUCTION UNITS—Cleveland Worm & Gear Co., Cleveland, Ohio. Catalog 300 is a comprehensive exposition of Speedaire fan-cooled worm gear reduction units. The Speedaire principle is fully detailed by cutaway pictures, charts, diagrams and engineering tables.

OPEN STEEL GRATING AND STAIR TREADS—William F. Klemp Co., 6601 South Melvina Ave., Chicago 38, Ill. Book of up-to-the-minute information on open steel grating and stair treads adds to detailed construction particulars, drawings and tabular specifications, providing full installation data for every requirement. Subjects covered are the uses of riveted and welded types of grating for open steel flooring, stairways, stair treads, fire escapes, loading platforms, decks for bridges and ships, automobile wash racks, drains, catwalks, tower stairs, boiler and engine rooms, sidewalks, partitions—in all nearly 50 of the numerous distinct services.

PROFESSIONAL SERVICES

Consulting Engineering Examinations
Specialists Geologists Reports
Plant Design Operation Construction

ALLEN & GARCIA CO.
ENGINEERS AND BUILDERS OF MODERN COAL OPERATION
Authoritative Valuations and Reports of Mining Properties, Equipment and Operation.
332 S. Michigan Ave., Chicago
120 Wall Street, New York, N. Y.

T. W. GUY
COAL PREPARATION
To Yield Maximum Net Returns
Face and Product Studies
Plant Design and Operation
Coal Sampling
Kanawha V. Bldg. Charleston, W. Va.

GEO. S. BATON & CO.
Consulting Engineers
Valuation, Mine Mechanization and Coal Preparation.
1100 Union Trust Bldg.
Pittsburgh, Penna.

C. C. MORFIT & ASSOCIATES
Consulting Engineers
Reports, Valuation, Construction, Operation, Management
11 Broadway, New York 4, N. Y.

EAVENSON & AUCHMUTY
Mining Engineers
Coal Operation Consultants
Valuations
Koppers Bldg. Pittsburgh, Pa.

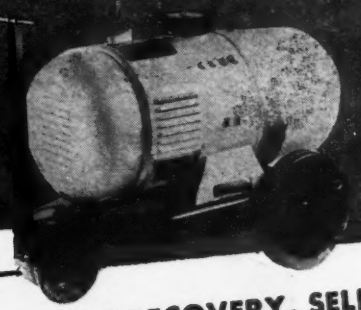
L. E. YOUNG
Consulting Engineer
MINE MECHANIZATION
MINE MANAGEMENT
Oliver Building—Pittsburgh, Pa.

J. H. FLETCHER
30 Years
Continuous Consulting Service to Coal Mines
Telephone Harrison 5151
McCormick Building Chicago, Illinois

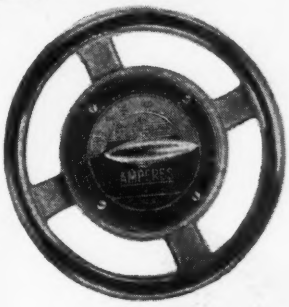
READERS MAY CONTACT THE CONSULTANTS
whose cards appear on this page with the confidence justified by the offering of these special services nationally.

3 WORK-SPEEDING FEATURES

make the "Hornet" tops in portable DC welders



1 SIMPLE 'GLOVE-GRIP' CURRENT CONTROL

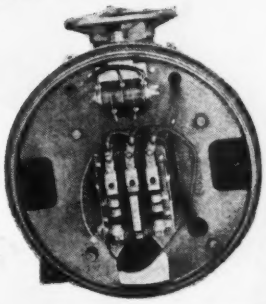


All current regulation over the "Hornet's" wide welding range is centralized in one convenient, easy-grip hand wheel. Accurately calibrated dial covers "high" and "low" ranges for infinite current settings.

2 FOOL-PROOF POLARITY CONTROL

Only by flicking this switch can polarity be changed from straight to reversed, or vice versa. Accidental polarity reversal is impossible on the "Hornet".

3 FAST RECOVERY, SELF-CONTAINED EXCITER



Extremely fast recovery far exceeding Navy requirements. Simplest, most efficient means of self-excitation is employed on the "Hornet". This close-up shows rectifier and starter.

FAMOUS FOR ITS *Penetrating "Stinger"*

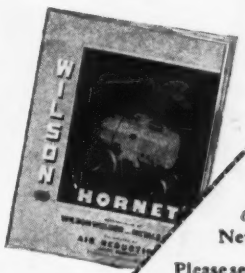
AND THESE OTHER IMPORTANT FEATURES

Throughout industry many important features of the "Hornet" have made it a widespread choice among operators. With its deep penetrating arc and excellent arc characteristics, it has earned the title—"the machine that makes the arc behave". • It starts easily... quickly • has "split-second" recovery • no sticking or "pop-outs" • and has unusually low spatter loss. • It's streamlined in design and easily portable. • All "live" parts are completely shielded.

The "Hornet" is made in 200, 300, and 400 ampere sizes. For complete details call or write any Air Reduction office, or mail coupon for illustrated catalog.

★ BUY UNITED STATES WAR BONDS ★

Send for Free Catalog



CA
Air Reduction
60 E 42nd Street
New York 17, N.Y.

Please send me a free copy of the Wilson "Hornet" Catalog.

Name.....

Company.....

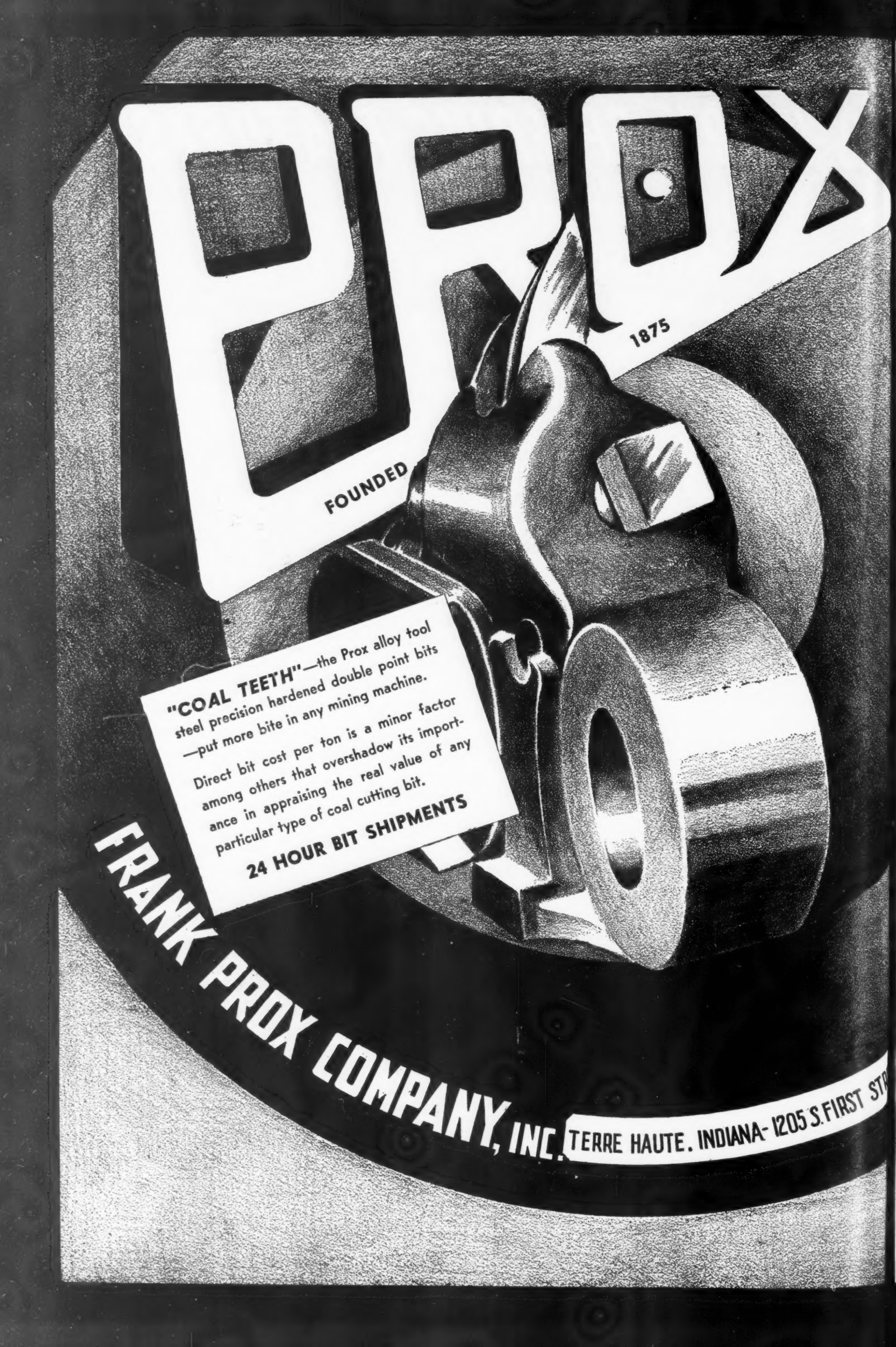
Address.....

City..... State.....

AIRCO WILSON

AIR REDUCTION

General Offices: 60 East 42nd Street, New York 17, N. Y.
In Texas: Magnolia Airco Gas Products Co. General Offices: Houston 1, Tex.
Offices in all Principal Cities


PROX
FOUNDED
1875
"COAL TEETH"—the Prox alloy tool steel precision hardened double point bits —put more bite in any mining machine.
Direct bit cost per ton is a minor factor among others that overshadow its importance in appraising the real value of any particular type of coal cutting bit.
24 HOUR BIT SHIPMENTS
FRANK PROX COMPANY, INC.
TERRE HAUTE. INDIANA- 1205 S. FIRST ST

BIG DEMAND MAY MAKE POST-WAR DIESELS SCARCE!
ORDER YOURS NOW! USE

Sheppard DIESEL Post-Priority Plan...

A BIG NICKELS WORTH OF DEPENDABLE POWER!
Sheppard Diesel Driven
Allis-Chalmers Unit Pumps
36,000 g.p.h. for 5c
R. H. SHEPPARD COMPANY HANOVER PA.
Sheppard

One installation demonstrating Sheppard Diesel economy and dependability was described in this advertisement—appearing in the June issue of this magazine.

WHEN THIS WAR ENDS, industry will need Diesels... plenty of them... as promptly as they can be obtained. But this very need for Diesels may make them hard to get.

Protect yourself! Order your Diesels now... through the Sheppard Post-Priority Plan.

No Guessing About the Future... No Involved Procedure

The operation of the Sheppard Plan is simplicity itself. You're not asked to guess the future. There's no involved ordering procedure.

You simply fill in the coupon at right stating your estimated Diesel needs. Sheppard engineers will make a recommendation suited to your requirements. This recommendation will be accompanied by a post-priority tentative order blank.

Once this order blank is returned, your name is placed on a special preference list. Names on this list will be given first claim on post-war Sheppard Diesels.

As soon as it is possible to place your order in production, Sheppard will notify you *of delivery date. Ten days after receipt of this notice,* your tentative order becomes binding.

Using the Sheppard Post-Priority Plan is simply thinking ahead to safeguard your future. Why risk being unable to obtain Diesels at a time when you may need them critically? Write today for your tentative order blank.

IT COSTS ONLY A PENNY NOW TO BE SURE OF A DIESEL LATER

PASTE COUPON ON POSTCARD

R. H. SHEPPARD COMPANY
103 MIDDLE STREET, HANOVER, PA.

Please have your engineers submit a recommendation for my power needs as specified below. I understand there is no obligation for this recommendation. Also enclose a Post-Priority tentative order blank.

_____ H. P. Diesel required for _____

Remarks _____

_____

(IF ABOVE SPACE IS NOT AMPLE, PASTE COUPON ON LETTERHEAD.)

Company _____

Address _____

_____

By _____ Title _____

Sheppard ALL AMERICAN DIESELS

Which of these Wire Ropes Would You Use?

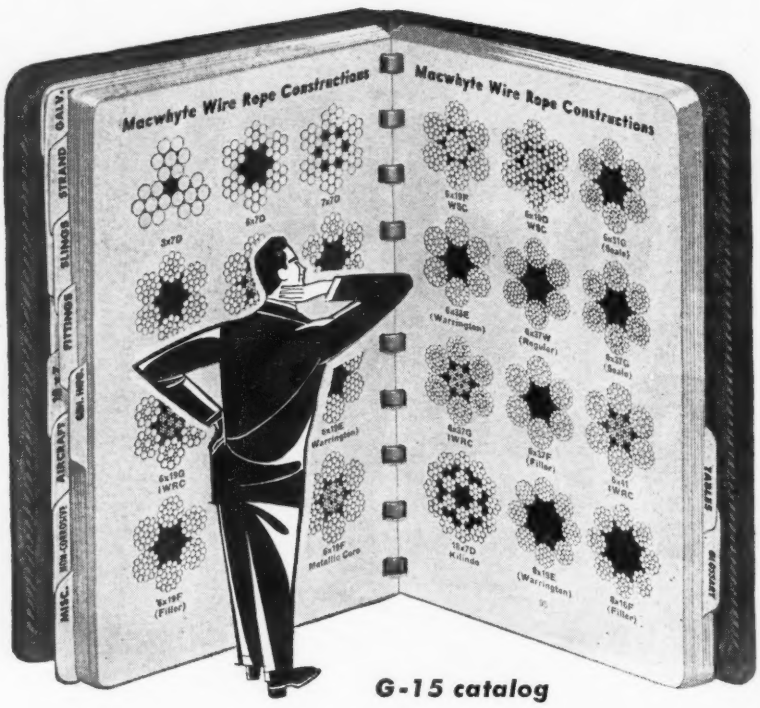
Years ago wire rope was not the highly specialized product it is today, nor was there as much use for wire rope or so many *different* uses.

Because of the many kinds of equipment using wire rope, plus the many and varied applications of that equipment, many sizes, grades, and constructions of wire rope must be made.

This makes it difficult for wire rope users to select the correct rope.

If the equipment is used in the normal way under average conditions, the manufacturer of the equipment can and does offer suggestions as to the type of rope they believe is best.

But should the equipment be altered to suit special needs, or should conditions not be average, a different wire rope specification is usually necessary for the best service.



G-15 catalog

Many Factors Considered

In recommending the correct wire rope for your equipment, several factors need to be considered:

1. Safety Factor—This has to do with the amount of loading and whether it is steady or a shock load.

2. Bending Fatigue—This has to do with the number and size of sheaves, size of drum, and also speed of rope.

3. Abrasion.

4. Type of Equipment.

5. Use of Equipment.

Conditions of service on a given type of equipment vary so much that it is often helpful to know the type of rope previously used and the service it gave.

Then after a study of this information, wire rope can be recommended that experience proves will give the best service.

Sounds difficult, doesn't it? Really it isn't difficult when you have the advice and counsel of Macwhyte Wire Rope Engineers. Just write to Macwhyte Company, its distributors or mill depots. Tell them the make and model number of your equipment, explain briefly what it is being used for, and mention the size, grade, and construction of the rope you are now using.

Remember — Macwhyte makes the "Correct Wire Rope For Your Equipment."

Pictured above are but a few of the types of wire rope made by Macwhyte so that you may have the "Correct Rope For Your Equipment." There is a size, grade, and construction of Macwhyte Wire Rope that will give you low cost, safe service.

MACWHYTE PREformed WIRE ROPE

Plus Internal Lubrication Selected Steels Tested-Proved

The correct rope for your equipment

NO. 717

MACWHYTE COMPANY

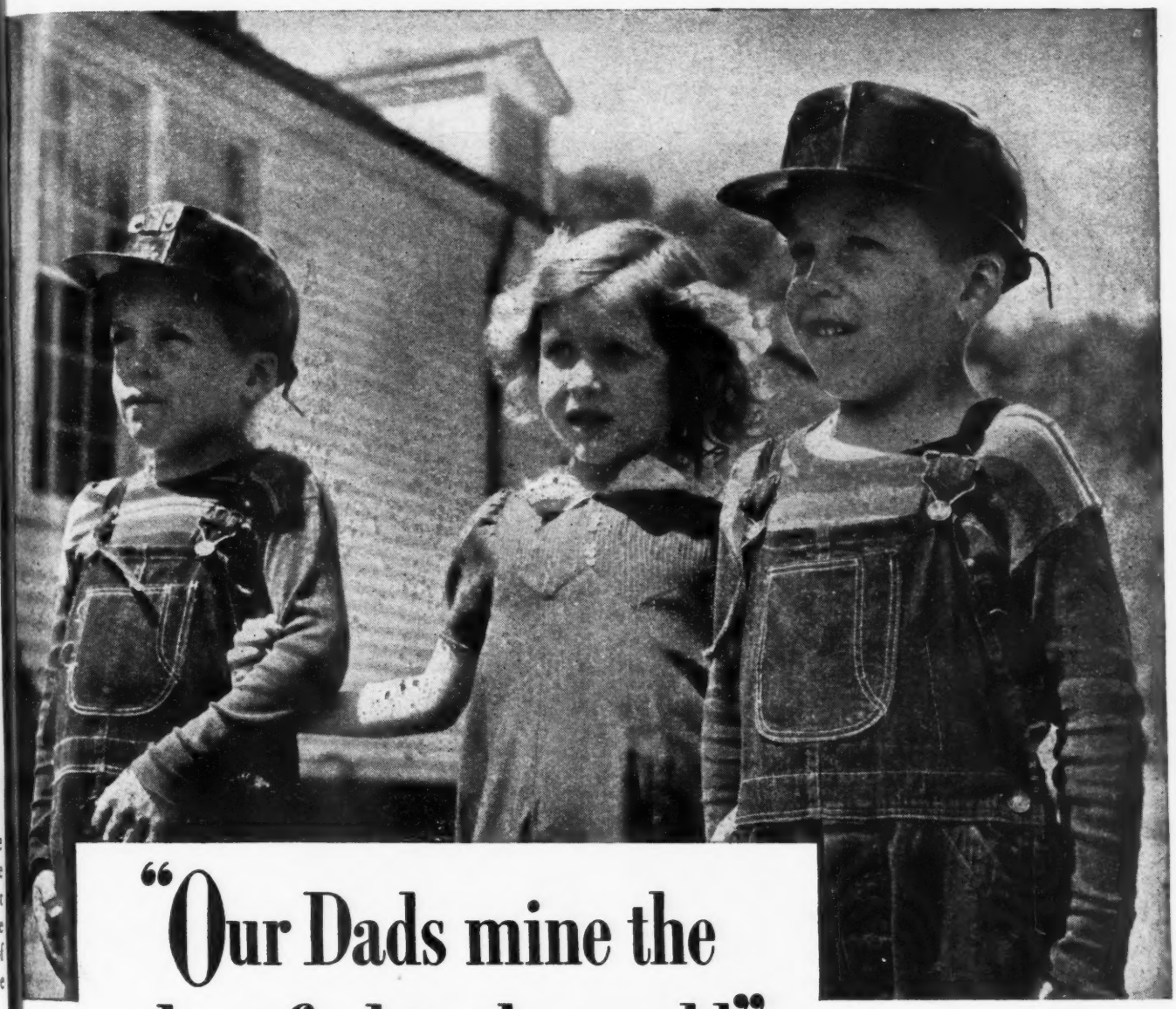
Wire Rope Manufacturers

ARMY E NAVY

2931 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York • Pittsburgh • Chicago • Fort Worth • Portland • Seattle • San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope — MONARCH WHYTE STRAND Wire Rope — MACWHYTE Special Traction Elevator Rope — MACWHYTE Braided Wire Rope Slings — MACWHYTE Aircraft Cables and Tie-Rods — MACWHYTE Stainless Steel Wire Rope — MACWHYTE Monel Metal Wire Rope



"Our Dads mine the best fuel in the world"

These young folks, dressed in hats like their Daddies', have good reason to take pride in the job their fathers are doing.

For their fathers bring from the ground America's No. 1 source of energy and power.

They bring forth the essential fuel needed for the production of steel—the prime power of the nation's railroad system—and the greatest source of electrical energy.

As you've probably guessed—the name of that fuel is bituminous coal.

And many advances have happened in coal mining, just as in other industries during recent years.

Today coal miners are paid better than the average wage of industry as a whole.

Their work is being constantly lightened and their efforts made more productive by modernization. 90% of all bituminous coal produced from underground workings is electrically cut and transported, and over half of all coal is loaded by mechanical shovels.

This fact has made possible the increases in volume of coal mined which the war effort has required.

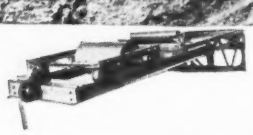
It is also an important reason why—despite manpower shortages—America's bituminous coal industry is supplying an all-time record volume of coal.

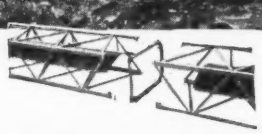
BUY MORE WAR BONDS

BITUMINOUS COAL *Institute*

60 EAST 42nd STREET, NEW YORK 17, NEW YORK

Simple as A B C





A variety of B-G terminals are available in a wide range of types, sizes and horsepower to meet the length and width of belt required. Factory assembled and shipped as units ready for bolting to the conveyor frame. Eliminates field assembly of miscellaneous pulleys, bearings, etc. These standardized units are being used on some of the largest conveying jobs in the world—in processing plants, storing and reclaiming, and underground installations.

B-G conveyor frames range from channel to truss type, in depths to meet the span requirements. Lengthening a conveyor is a matter of adding the required number of sections. Terminal units attach directly to any section facilitating revamping of conveyor system. Standardized units simplify plant design and erection.

Carriers and return rollers are of all-steel construction, jig-welded to insure accuracy of alignment and furnish maximum strength with minimum weight. Available in roller, ball or plain bearings, and as troughing, flat, self-aligning, and special rubber impact carriers. Properly designed carriers standardized to provide uniformity prevent costly belt wear.

There is nothing complicated about using Barber-Greene standardized belt conveyor units. They are pre-engineered and designed for production manufacture. You can custom build your material handling and utilize interchangeable conveyor units. The B-G Conveyor Catalog 76 or Coal Mine Catalog 66 illustrates and tabulates the units available as standard manufacture. From this list, you select the equipment fitted to your needs. Barber-Greene engineers and mining consultants can help you plan for now and for future expansion.

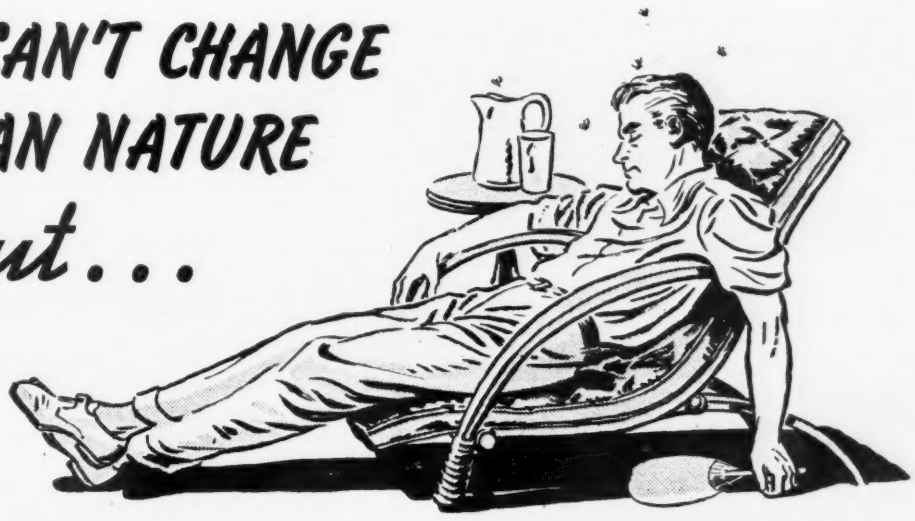
44-80

BARBER GREENE

ARMY E NAVY

AURORA, ILL., U. S. A.

YOU CAN'T CHANGE HUMAN NATURE *but . . .*



DESPITE all the appeals of government and industry, coal consumers will *not* place sufficient orders during the summer to ease the demands for peak production next winter.

You can't change human nature, but . . . by using the new Robins Mine Conveyor . . . you can get out *more* tonnage . . . more easily, more smoothly, more efficiently . . . thereby making your production *more* profitable.

Look at these features, and you can see why:

1. 4" Idlers—handle heavier loads over longer distances without burning themselves out.

2. 300 TPH capacity over lengths up to 3000 ft. The new Robins Mine Conveyor operates normally with single Pulley Drive; but Pulley outfits are built into Head Section for Tandem Pulley Drive to handle this tonnage over that length.

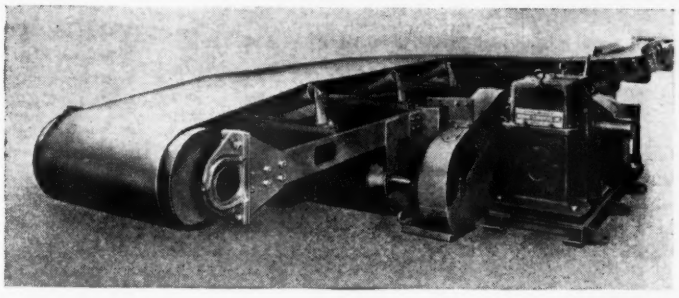
3. Belt line 15" above floor—with return Idlers so designed they clear both floor and floor-accumulations.

4. Ratchet-and-pawl-Takeup built in, with provision for easy attachment of counter-weighted gravity type if desired.

5. Takeup in Headsection—operates from either side—enables belt-tension to be adjusted without crawling full length of conveyor.

6. Conveyor EASILY extended—Intermediate Sections are dropped-in (not bolted) as needed. Enables Conveyor to follow contour of seam. Alignment assured because sections are jig-assembled in our shop and shipped in one piece. Deck plates in Intermediate Sections are unusually-heavy gauge metal.

In addition, the new Robins Mine Conveyor offers these features . . . fed from tail-end or anywhere along entire length of Intermediate Sections . . . skirtboards easily attached, wherever required, by means of hook bolts . . . operates in reverse direction—carries men and materials into the mine . . . can be assembled, extended or moved without using tools . . . Head and Tail Sections mounted on skids for smooth sliding over rough surfaces . . . no steel work projecting below them . . . both ends easy to clean out.



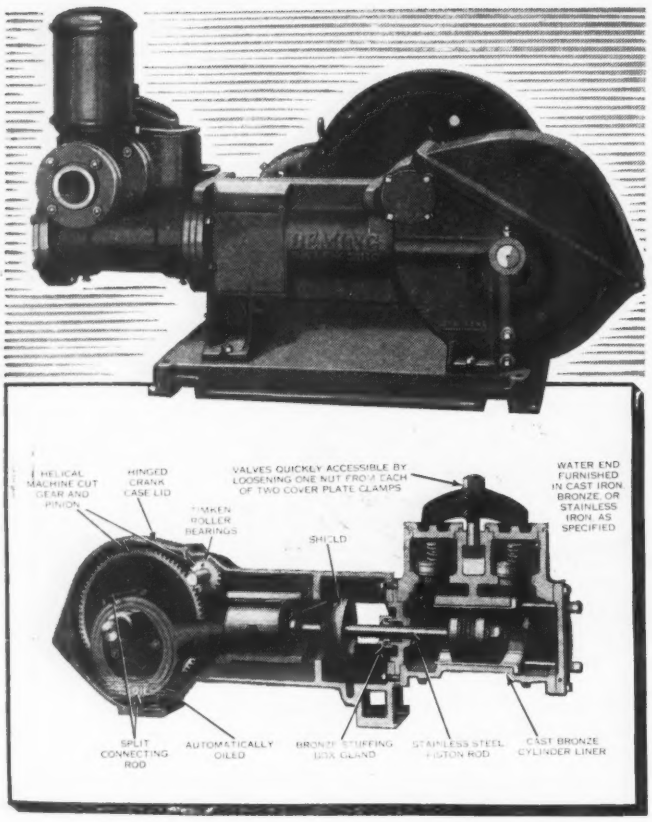
Write Robins for full details or ask a Robins Engineer to call and show you how this new Mine Conveyor will increase your tonnage to meet not only the demands of next winter . . . but of many, many winters to come. Please address Dept. CA-8.

ENGINEERS • MANUFACTURERS • ERECTORS

ROBINS CONVEYORS
INCORPORATED
Founded in 1896 as Robins Conveying Belt Co.
PASSAIC • NEW JERSEY
MATERIALS HANDLING MACHINERY

ROBINS *makes:* BELT CONVEYORS • COAL AND ORE BRIDGES • BUCKET ELEVATORS • CAR AND BARGE HAULS • CAR DUMPERS • CAR RETARDERS • CASTINGS • CHUTES • CONVEYOR IDLERS AND PULLEYS • CRUSHERS • FEEDERS • FOUNDRY SHAKEOUTS • GATES • GEARS • GRAB BUCKETS • PIVOTED BUCKET CONVEYORS • VIBRATING SCREENS • SCREEN CLOTH • SELF-UNLOADING BOAT MECHANISMS • SKIP HOISTS • STORAGE AND RECLAIMING MACHINES AND SYSTEMS • TAKEUPS • LOADING AND UNLOADING TOWERS • TRIPPERS • WEIGH LARRIES • WINCHES • WINDLASSES

FOR MATERIAL AID IN MATERIALS HANDLING . . . . . It's **ROBINS**


HELICAL MACHINE CUT GEAR AND PINION
HINGED CRANK CASE LID
TIMKEN ROLLER BEARINGS
VALVES QUICKLY ACCESSIBLE BY LOOSENING ONE NUT FROM EACH OF TWO COVER PLATE CLAMPS
SHIELD
WATER END FURNISHED IN CAST IRON, BRONZE OR STAINLESS IRON AS SPECIFIED
SPLIT CONNECTING ROD
AUTOMATICALLY OILED
BRONZE STUFFING BOX GLAND
STAINLESS STEEL PISTON ROD
CAST BRONZE CYLINDER LINER

DEMING "OIL-RITE"

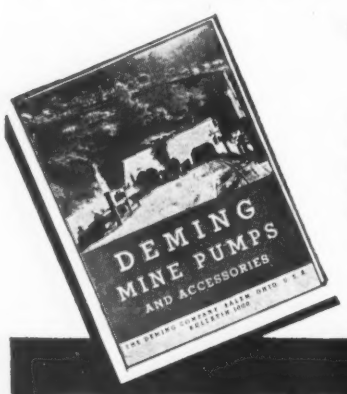
Double-Acting Mine Pumps

Features of the Figure 1896 Deming "OIL-RITE" were designed specifically for heavy duty mine gathering service.

All valves in the water end are accessible without disturbing pipe connections. Timken Tapered Roller Bearings adjustable for wear, are used on the pinion shaft.

Piston rod provides high resistance to scoring and to corrosion by acid water. *Many more features.*

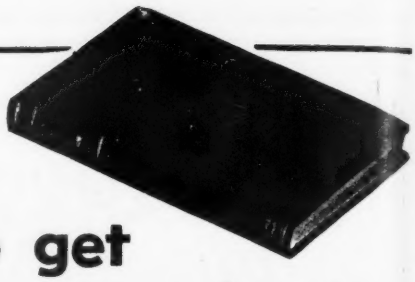
Figure 1896 Deming Double-Acting Mine Pump is furnished in four types of drive, all illustrated and described in Bulletin 1000.



THE DEMING COMPANY
SALEM, OHIO

Send for special Bulletin 1000 which contains important data on the complete line of Deming Mine Pumps and Accessories.

DEMING
Mine Pumps



How to get peak coal production

from your mechanical-loading equipment

Here are the most efficient methods of using various types of loading machines, conveyors, scrapers, and certain special equipment, in the loading and handling of coal underground, now presented in a readable, thorough, and practical treatment.

Mechanical Loading of Coal Underground

By IVAN A. GIVEN
EDITOR-IN-CHARGE, *Coal Age*

397 pages, 6 x 9, 222 illustrations, $4.00

THIS practical manual thoroughly discusses the various types of equipment used in slope-sinking, entry-driving and development work, and in production of coal from the usual or regular working sections—details the methods suited to or used with the various types of equipment and under various seam thicknesses and natural conditions—tells how machines are best installed, where they can fill in for other types of equipment, what to do to get biggest production from equipment.

Included in this sound book are over 200 necessary maps, plans, and sketches, showing how methods described in the text are practically applied to actual working conditions. A liberal number of mining plans tested in given mines throughout the country are here, as well as the latest thought on face preparation, power supply, and maintenance.

Tells you:

—every possible way in which equipment can be used
—how to keep equipment in first-class running order
—what factors to consider in purchasing mechanical-loading equipment
—when a small investment in simple attachments saves the purchase of an entire new machine
—installation considerations for all equipment
—methods for increasing mining extraction etc., etc.

CONTENTS

1. Mechanical-Coal-loading Principles
2. Mechanical-Coal-loading Essentials
3. Types of Mechanical-loading Units, Characteristics, Crews, Unit production—Hand-loaded Equipment
4. Types of Mechanical-loading Units, Characteristics, Crews, Unit Production—Self-loading Equipment
5. Slope-sinking and Development with Mechanical-loading Equipment
6. Conveyor-mining Plans
7. Scraper-mining Plans
8. Mobile-loader Mining Plans
9. Face Preparation
10. Power for Mechanical Loading
11. Maintenance in Mechanical Loading

McGRAW-HILL ON-APPROVAL COUPON

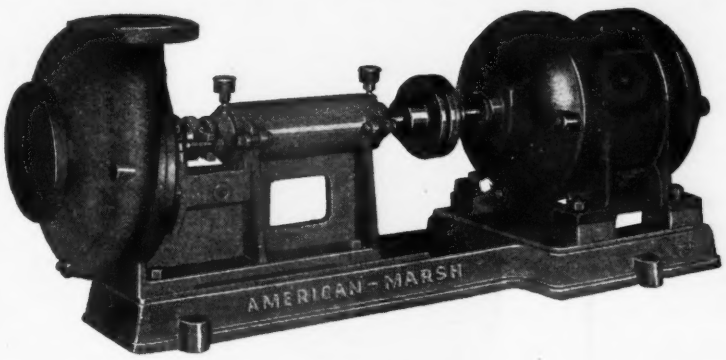
McGRAW-HILL BOOK CO., 330 W. 42 St., New York 18, N. Y.
Send me Given—Mechanical Loading of Coal Underground for 10 days' examination on approval. In 10 days I will send $4.00, plus few cents postage, or return book postpaid. (Postage paid on cash orders.)

Name .....
Address .....
City and State .....
Position .....
Company ..... C 8-44
(Books sent on approval in U. S. and Canada only.)

HIGH Efficiency at LOW Cost

AMERICAN-MARSH PUMPS

SINGLE STAGE, SINGLE SUCTION BALL BEARING CENTRIFUGALS



TYPE RDM

Heavy duty, double ball bearing, motor driven construction. Also available with steam turbine, gasoline or diesel engine, or belt drive.

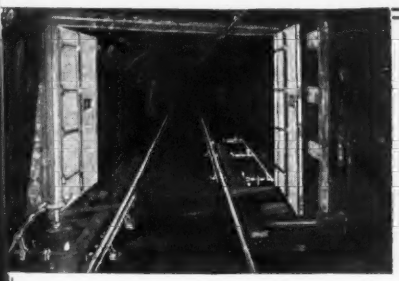
American-Marsh Type R Centrifugal pumps offer high efficiencies at the lowest prices consistent with sound engineering and sturdy construction. Available in bronze fitted, all iron or special metal construction for handling corrosive liquids. There are 38 sizes covering a range of capacities to 4500 GPM at pressures as high as 150 pounds.

Send for Bulletin 300-CA

CENTRIFUGAL, TURBINE, STEAM AND POWER PUMPS

AMERICAN-MARSH PUMPS INC.
BATTLE CREEK, MICHIGAN

PUMPS, AND PUMPS ONLY SINCE 1873



Reduce Costs • Increase Tonnage

This automatic device will eliminate lost time by speeding trips efficiently and safely, enabling perfect coordination of loading — transportation and tipple.

The CANTON Automatic Door

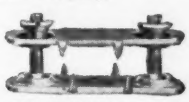
. . . requires no attendant and little attention. Opens automatically in a split second. Closes soon as last car has passed. Improves ventilation by maintaining velocity of air.

The AMERICAN Mine Door Company

2057 Dueber Avenue Canton 6, Ohio

Keep your conveyor belts going with FLEXCO HD BELT FASTENERS

• **FLEXCO H D RIP PLATES** are used in repairing rips and patching conveyor belts. The wide space between outer bolts gives the fastener a long grip on the edges of the rip, while the center bolt prevents the fasteners from bulging.



• **FLEXCO H D BELT FASTENERS** make a strong, tight butt joint with long life. Recessed plates embed in belt, compress belt ends and prevent ply separation. Six sizes in steel and alloys.

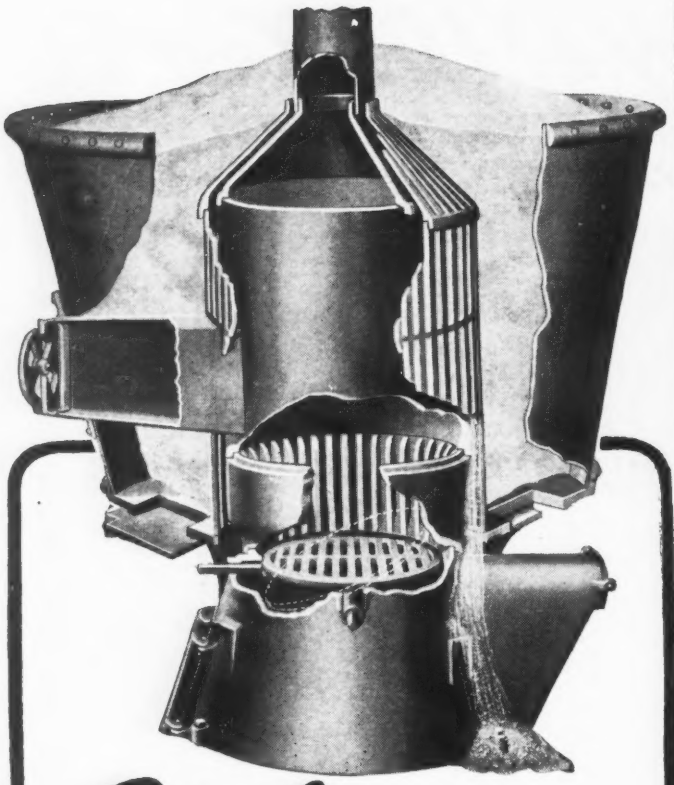
• Avoid shutdowns and lengthen the life of your conveyor belts and bucket elevator belts by using Flexco HD belt fasteners and rip plates. Thousands of companies have stepped up the performance of conveyor lines and cut costs by using Flexco methods.

Bulletin F-100 shows exactly how to make tight butt joints in conveyor belts with Flexco HD Belt Fasteners. Also illustrates step by step the latest practice in repairing rips and putting in patches.

Write for your copy

FLEXIBLE STEEL LACING COMPANY
4638 Lexington St., Chicago

FLEXCO HD BELT FASTENERS
Sold by supply houses everywhere



Viloco

AUTOMATIC SAND DRYER

Reduces Fuel Costs for Drying Sand

The operation of the Viloco Sand Dryer is automatic—sand flows freely through the grating as it dries. The grating is so constructed that it prevents wet sand coming in contact with the stove. Plenty of cleaning slides are provided around the hopper base for ready removal of any material that cannot pass through the grating. The fire grate can be removed through the ash door. Parts of stove subjected to fire are made of Chrome Nickel Heat Resisting Iron.

The Viloco Sand Dryers are made in two sizes. The hopper capacity of the No. 1 featured above is 3 cubic yards and a smaller size, No. 2, with 1 cubic yard capacity.

The hopper should empty itself about once every two hours under ordinary conditions.

VILOCO RAILWAY EQUIPMENT CO.

332 SOUTH MICHIGAN AVENUE · CHICAGO

Use explosives safely

by knowing their specific action

Here is a book that tells in as simple a way as possible the sequence of events leading up to an explosion, the phenomena produced, and the effects of these phenomena on the surroundings. Clear, concise, up-to-date, the book gives data on 125 notable explosions and charts practical graphs of the damage from these actual charges.

Just Published

EXPLOSIONS

Their Anatomy and Destructiveness

By CLARK SHOVE ROBINSON

Department of Chemical Engineering, Massachusetts Institute of Technology, Lieutenant Colonel, Ordnance Reserve, U. S. Army

88 pages, 5½ x 8½, 27 illustrations, $1.50

BASED on lectures given to auditors of the Safety and Security Branch of the Office of the Chief of Ordnance, Army Service Forces, this book makes clear the hazards involved in dealing with the different types of explosives and gives important suggestions for dealing with them intelligently.

What are the most destructive types of explosives? How much heat will set off a charge of tetryl? What are maximum detonation rates of various high explosives? What is the danger distance from flying missiles? This book will answer many such questions, showing you what causes an explosion, what happens when the charge goes off, and the actual effects of the explosion on the surroundings.

It gives a sound explanation of earthwaves, showing how to predict the amplitude of an earthwave. It gives clear descriptions of crater formation by explosions, and analyses of the effect of explosion blast on structures. It includes practical safety factors in dealing with explosives and charges.

Special Feature

Data on 125 actual explosions are graphed, showing at a glance maximum distance of major and minor damage of various types.

ASK TO SEE IT 10 DAYS FREE

Covers such topics as:

- —how to test relative sensitivity of an explosive to shock
- —effect of a medium other than air on sympathetic detonation
- —how to predict the penetration coefficient of a missle
- —how to compute negative or suction pressure of an explosion
- —what kind of protective barricade is best for various explosives
- —maximum distance of minor structural damage from earthwaves, etc.

McGRAW-HILL ON-APPROVAL COUPON

McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y.

Send me **Robinson's Explosions** for 10 days' examination on approval. In 10 days I will send $1.50, plus few cents postage, or return book postpaid. (Postage paid on orders accompanied by remittance.)

Name .....

Address .....

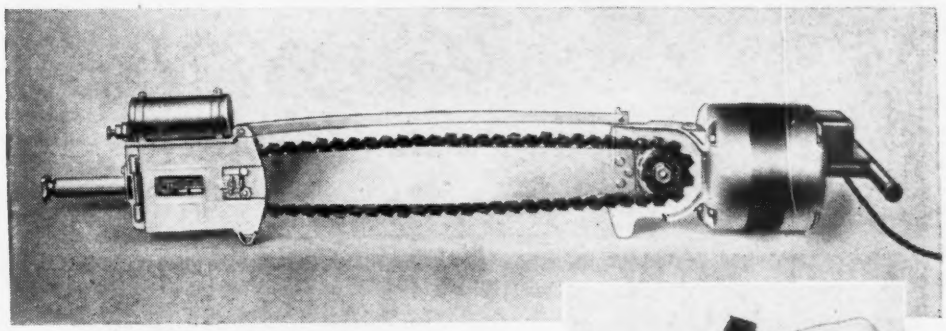
City and State .....

Position .....

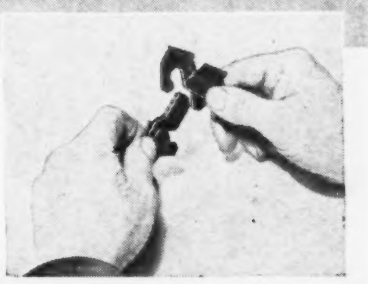
Company ..... C. 8-44

(Books sent on approval in U. S. and Canada only.)

LOMBARD CHAIN LIGHTNING FOREST SAWS



Seven distinct advantages feature this new time and labor saving Power Chain Saw. Its faster cutting action, longer life and no clogging features make it the ideal timber tool. The chain links are easy to sharpen and quickly replaceable and, because of the narrower kerf, uses much less power.



REPLACEMENT UNITS AVAILABLE

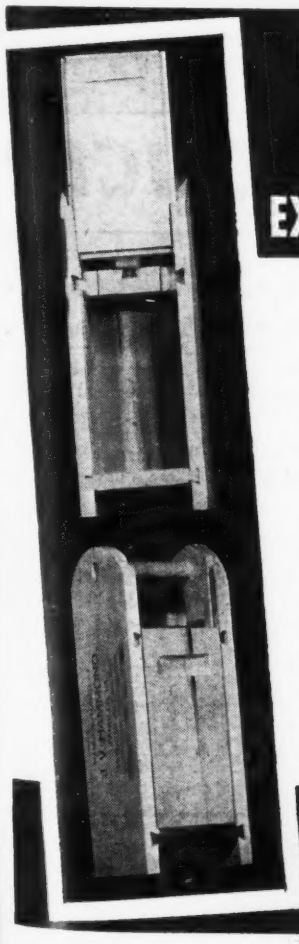
Bring your present Chain Saw equipment up to date with the new Lombard replacement units, giving you all the advantages of a new saw at much less cost.

ARMY NAVY

LG LOMBARD Governor CORPORATION

ASHLAND MASSACHUSETTS

Sales Office: 60 East 42nd Street, New York 17, N. Y.



HAMMOND'S *Latest Type* SAFETY EXPLOSIVE BOXES

Approved by Penna. Dept. of Mines

Boxes are constructed entirely of wood, having no metal parts. They are of tongue-grooved and dovetailed construction, having handle for carrying, and are equipped with automatic lock using rubber bands for a spring.

NOTE: There are NO metal parts . . . conforming to regulations of the Penna. Dept. of Mines.

Important: Prompt deliveries of these Hammond products: safety explosive boxes — wood tamping poles — shovel handles — rope rollers — trolley poles. Order today or write for further details.

NET PRICES

Boxes Made in These Sizes:

No. 9	Powder Box	9 stick size	1.12
No. 12	Powder Box	12 stick size	1.27
No. 16	" "	16 " "	1.43
No. 20	" "	20 " "	1.58
No. 36	" "	36 " "	2.94
No. 72	" "	72 " "	4.23
No. 6	Detonator Box	2½x3x6 inside	1.01
No. 8	" "	2x2½x8 inside	1.01

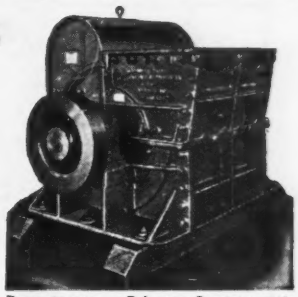
J. V. HAMMOND

SPANGLER, PENNA.

GRUENDLER CRAFTSMANSHIP

Serving Industry over 50 Years

Master Builders of Coal Reduction and Sizing Equipment



Ring Hammer Primary Crusher with patented tramp-metal catcher.

For uniform coal sizes Lump, Egg, Nut, or Stoker

Primary crushing of Bituminous mine run coal to 4" minus, capacity 5 Tons per hour, with the Gruendler Ring Hammer Crusher.

WRITE FOR DATA

Allow our Engineers to furnish you, without obligation, Blue Prints and Specifications on Crushing and Screening Equipment for— MINES — BY-PRODUCT COKE PLANTS AND BRIQUET MANUFACTURERS.

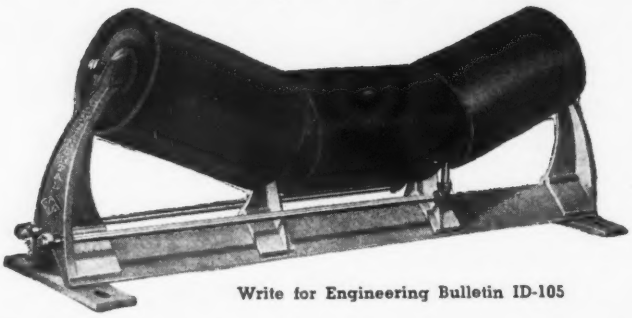
Refer also to Coal Mining Catalog

GRUENDLER

CRUSHER and PULVERIZER CO.

2915-17 North Market St., ST. LOUIS (6), MO.

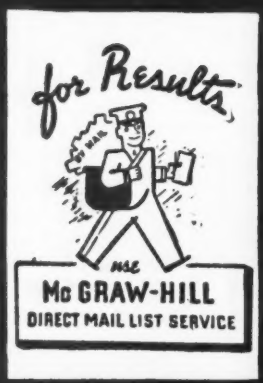
Continental IDLERS
Solve Your Haulage Problems



Write for Engineering Bulletin ID-105

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA
ATLANTA • DALLAS • MEMPHIS

What Makes A Mailing *CLICK?*



Advertising men agree—the list is more than half the story.

McGraw-Hill Mailing Lists, used by leading manufacturers and industrial service organizations, direct your advertising and sales promotional efforts to key purchasing power. They offer thorough horizontal and vertical coverage of major markets, including new personnel and plants. Selections may be made to fit your own special requirements.

New names are added to every McGraw-Hill list daily. List revisions are made on a twenty-four hour basis. And all names are guaranteed accurate within two per cent.

In view of present day difficulties in maintaining your own mailing lists, this efficient personalized service is particularly important in securing the comprehensive market coverage you need and want. Ask for more detailed information today. You'll probably be surprised at the low over-all cost and the tested effectiveness of these hand- picked selections.

Direct Mail Division

McGraw-Hill Publishing Co., Inc.
330 West 42nd Street *New York, 18, N. Y.*

VULCAN-DENVER

Portable
ROOM HOISTS

For servicing shaker conveyors in mechanical coal loading. Fast, compact, rugged. Sled mounted, ball bearings thruout, unbreakable steel-clad construction. 60 used at one property. 3 or 5 H.P. Rope pull 1750 lbs Wt. 950 lbs.

Electric, Steam, Diesel & Gasoline Hoists--Scrapers, Loaders, Conveyors, Skips, Cages, Sheaves.

VULCAN IRON WORKS CO
DENVER COLORADO

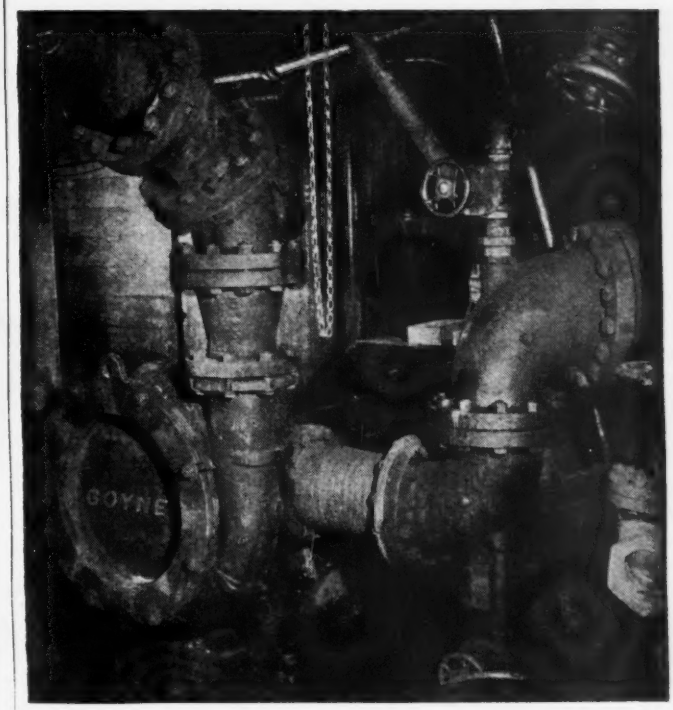
MAN-power . . . . . "MP"

It takes Man-Power to make modern organization and equipment effective. The Man-Power of the industry served by COAL AGE is the experienced personnel included among the 12,000 subscribers of this paper. If your organization needs MAN-power, you can locate the best man, or men, available through a Position Vacant Advertisement in the SEARCHLIGHT SECTION of COAL AGE.

PERFORATED METAL
COAL MINING SCREENS
Manufactured exactly to your specifications
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.

CHICAGO PERFORATING CO.
2443 West 24th Place
CHICAGO, ILLINOIS
Canal 1459

GOYNE PROCESS PUMPS



A Sand Pump is only a link in a chain in a coal washing plant, but it can be a strong link if it embodies the following features as does the Goyne:

1. Ease of inspection of all wearing parts. All internal portions are immediately accessible after removing only the rear head of the pump. No suction or discharge piping is disturbed.

2. The one packing box of the pump is subjected only to suction pressure and is readily kept clean by a low pressure clear water line. Long packing and shaft sleeve life is assured.

3. Impeller clearance is adjusted *while the pump is running*, insuring constant pump capacity so essential for uniform washing.

4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and simplifies piping.

5. We carry the spare parts stock. Order your replacements when needed. Reduce your inventory by using Goyne Process Pumps.

All inquiries receive prompt and careful attention.

THE GOYNE STEAM PUMP CO.
ASHLAND, PA.

Just in case you've eased up... ON YOUR PAY ROLL PLAN

Pause one brief moment. Compare your lot—and that of the men and women in your employ—with the lot of the infantrymen who meet the enemy face to face, who do the hardest fighting, who suffer the most casualties.

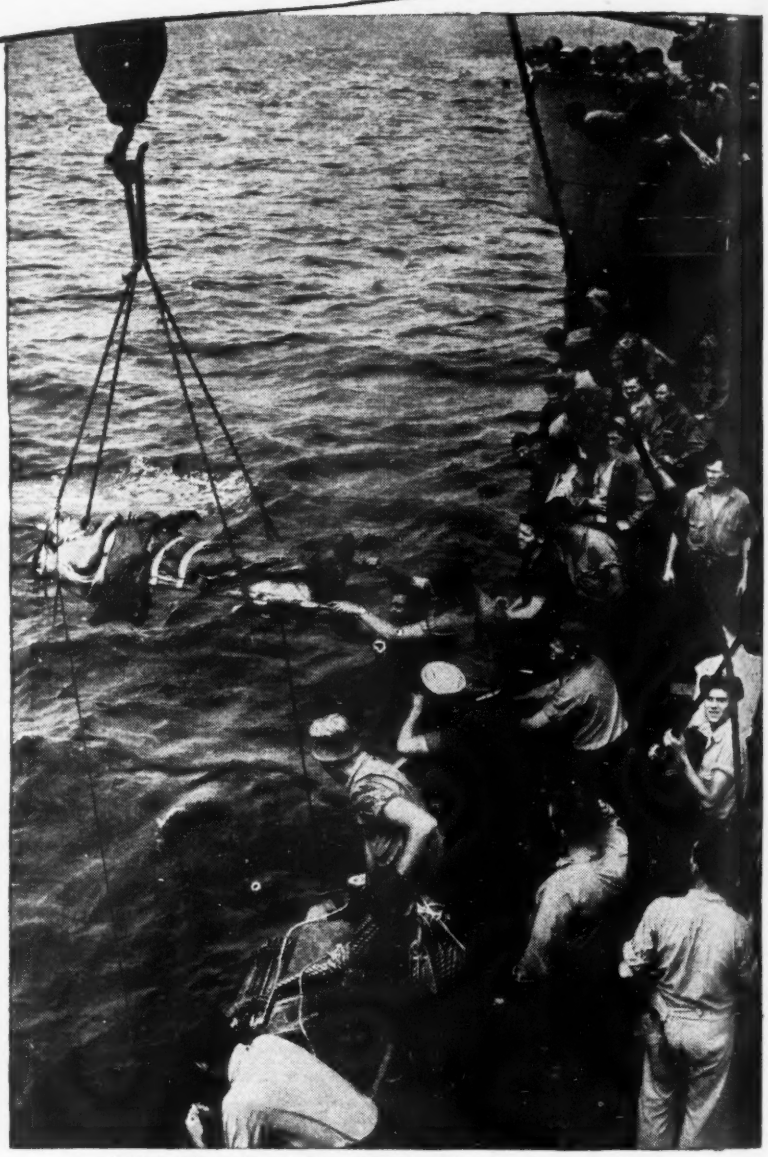
Let the full impact of war's unending grimness swiftly convert any tendency toward complacency into revitalized urgency. Remember—the war is not yet won.

As top management and labor, you've been entrusted with two major responsibilities—steadily maintained production, and steadily maintained War Bond Sales *through your Pay Roll Savings Plan.*

Decide *now* to revitalize your plant's Pay Roll Plan. Have your Bond Committee recheck all employee lists for percentages of participation and individual deductions. Have Team Captains personally contact each old *and new* employee. Raise all percentage figures wherever possible.

Don't underestimate the importance of this task. This marginal group represents *a potential sales increase of 25% to 30% on all Pay Roll Plans!*

Your success will be twofold: A new high in War Bond Sales; and a new high in production. Because a worker with a systematic savings plan has his mind on his work—not on post-war financial worries. He's taking care of the future now. His own. And his Country's future. *Help him!* REVITALIZE YOUR WAR BOND PAY ROLL SAVINGS PLAN.



Official U. S. Coast Guard Photo: The elevator to a Coast Guard-operated transport hospital

Back the Attack!

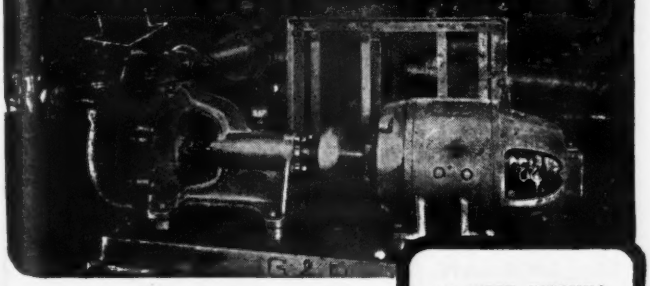
SELL MORE THAN BEFORE!

The Treasury Department acknowledges with appreciation the publication of this message by

COAL AGE

This is an official U. S. Treasury advertisement—prepared under the auspices of Treasury Department and War Advertising Council.

it PUMPS 24 hours a day with no "shut downs"



The keynote of the dependable G & R Mine Gathering Pumps is the word "simplicity". Because of greater simplicity (only one moving part — the impeller), these Self-Priming Centrifugals will pump more water, more continuous hours, per dollar invested than any other type. No valves to clog; no cylinder liners to be cut out; no gears, cams, levers, etc., to wear, break, or cause trouble. Pumps operate at motor speed. Capacities up to 220 GPM; heads up to 125 ft. Our engineering department will survey your requirements and make recommendations or write for Bulletin MP-2. It's free.

See our catalog data in Coal Mining Catalogs

IN WEST VIRGINIA

the Koppers Company are replacing old pumps as they wear out with G & R self-priming centrifugal mine gathering pumps. At the Helen, Stanaford, Kimball, Stotesbury and Kopperstown Mines 36 G & R Pumps of varying capacities are daily proving their simplicity and dependability.

Distributors in all principal Mining Areas.

GORMAN & RUPP PUMPS — UNSURPASSED FOR PUMPING FAST

THE GORMAN-RUPP CO.
MANSFIELD, OHIO

SUTTON SAND DRYING STOVES

The Standard for Over Forty Years

Can Be Operated By Unskilled Labor

Today, when there's manpower shortage, it's important that your equipment is easy to operate—by anybody. That's an important feature of Sutton Sand Drying Stoves. Any worker about the plant can operate it to full capacity.

SUTTON FEATURES

- **Made in four sizes to meet all conditions.**
- **Low original cost**
- **Economical upkeep**
- **Distributed by jobbers in all principal cities**

Satisfaction Guaranteed
Catalog and Prices sent upon request

INDIANA FOUNDRY COMPANY
950 Oak St., Indiana, Pa.

HENDRICK

Carbondale 1600

for

PERFORATED PLATE

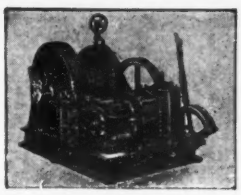
Round—Square—Diagonal—Slot

Any perforation

HENDRICK MANUFACTURING CO.
41 DUNDAFF ST., CARBONDALE, PA.

Sales Offices in Principal Cities
Please Consult Telephone Directory

FLORY HOISTS



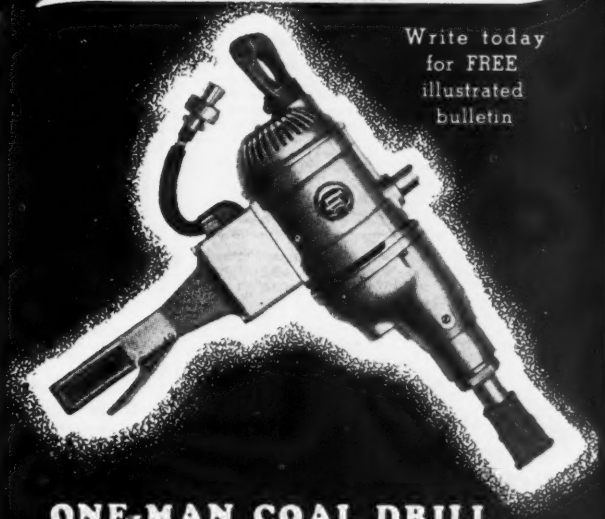
Manufacturers of Steam, Electric and Gasoline Hoists of all types; also parts for all model Flory Hoists.

FLORY MANUFACTURING CO.
BANGOR, PENNSYLVANIA

The Cincinnati

TRADE MARK

Write today for FREE illustrated bulletin

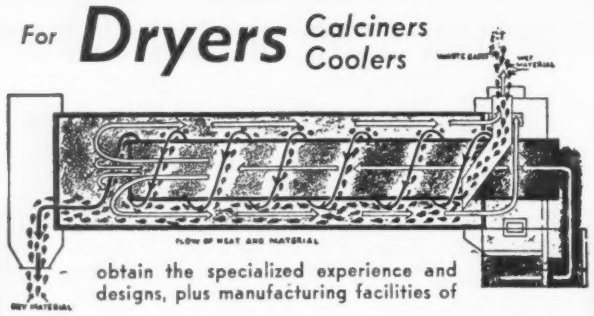


ONE-MAN COAL DRILL

. . . .lowers drilling costs because it is designed and constructed to give more power "pound for pound" and more drilling efficiency "day after day." Used successfully in drilling both anthracite and bituminous coal. Easy to operate. Sold with money-back guarantee. Write today.

THE CINCINNATI ELECTRICAL TOOL CO.
Division of The R. K. LeBlond Machine Tool Co.
2077 MADISON ROAD • CINCINNATI, OHIO

For **Dryers** Calciners Coolers



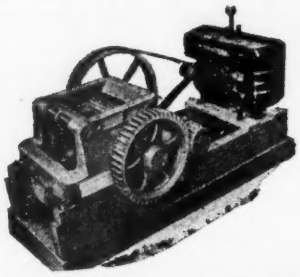
obtain the specialized experience and designs, plus manufacturing facilities of

THE **L.R.CHRISTIE CO.**

17 E. 42nd St., New York 17, N. Y.

"Send us your problems—we would enjoy solving them."

"BANTAM-BUSTER" COAL CRUSHERS



McLANAHAN BUILDS A TYPE AND SIZE FOR EVERY COAL CRUSHING REQUIREMENT! WRITE FOR DATA.

McLANAHAN AND STONE CORPORATION
ESTABLISHED 1835 HOLLIDAYSBURG, PENNA.

WOOD PIPE for Mine Drainage

Wyckoff Wood Pipe has an 89 year record of perfect resistance to the corrosive action of sulphurous mine water. It is an ideal, long-time investment—light, easy to lay, and relatively low in first cost.

We also manufacture a special Hard Maple Pipe for flushing culm in the Anthracite Region and wood covering for underground steam lines.

Established 1855

Shipments from stock day after receipt of order. Send for catalog.

A. WYCKOFF & SON CO.
Office and Factory
No. 35 Home Street, Elmira, N. Y.
The Originators of Machine Made Wood Pipe

Emergency orders can be delivered by truck to mines in Pennsylvania coal fields following morning after receipt of same.

POSITIONS WANTED

SUPERINTENDENT, twenty years practical mining experience, technically trained, qualified to handle all phases of coal mine operations. Physically fit, age 47, head of family. PW-267, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

CHEMIST with thorough knowledge of preparation problems seeks position. University graduate, twenty years analytical experience in organic and inorganic work. Past fourteen years Chief Chemist to large bituminous producer. Experienced in blending for coke and by-products. Understand domestic and industrial water treatment. Prefer small progressive company. Good reasons for desiring change. Location immaterial. PW-268, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

SALESMANAGER 38 years old, broad educational background, chemist, engineering training, geology, opened and operation own coal mine, five years office experience, twelve years salesman heavy chemicals and pharmaceuticals. Capable executive and salesman can build and train a producing sales force. Located in middlewest, salary now $6000 and other inducements, interested in Coal, coal by-products or chemicals. Must be permanent organization, no intangibles, will arrange interview. PW-270, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

REPRESENTATIVE AVAILABLE

RELIABLE COAL organization of long standing on Eastern Seaboard seeks sole selling agency relationship with producer desiring a good job over next 20 years. RA-269, Coal Age, 330 W. 42nd St., New York 18, N. Y.

(Additional Selling Opportunity Ad on page 197)

BUSINESS OPPORTUNITY

SALE OR LEASE, high grade coal property, tests 11 to 12 B.T.U. U.S. estimate 12 to 14 million tons on good highway, large market, good report, Box 256, Townsend, Montana.

FOR LEASE True Arkansas Anthracite slope mine fully equipped. Arkansas Anthracite Coal Co., Russellville, Arkansas.

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT : "OPPORTUNITIES" : EQUIPMENT
BUSINESS : : USED OR RESALE

UNDISPLAYED ——RATES—— DISPLAYED

(Not available for equipment advertising)
10 CENTS A WORD. MINIMUM CHARGE $2.00.
Positions Wanted (full or part time individual salaried employment only), ½ the above rates payable in advance.
Box Numbers—Care of publication New York, Chicago or San Francisco offices count as 10 words.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Individual Spaces with border rules for prominent display of advertisements.

The advertising rate is $6.30 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on one column, 3 columns—30 inches—to a page.

NEW ADVERTISEMENTS received by August 25 will appear in the September issue, subject to limitations of space available.

WANTED

COAL STRIPPERS

Contract to strip five million tons of high grade Penna. low volatile coal available. Very profitable long time contract.

JULIETTE COAL CO.
Grant Bldg. Pittsburgh, Pa.

AVAILABLE SHORTLY

TIPPLE and TRACKS, etc.

With many other surface items all in good operating condition. Shaking Screens, tables, booms, crusher, vibrating screens, retarders, motors included. For sale as a complete unit only. For details address.
FS-272, Coal Age
520 North Michigan Ave., Chicago 11, Ill.

WANTED

LARGE COAL ACREAGE

Corporation will pay cash for going coal stripping operation with large coal acreage or will purchase coal acreage and strip with our equipment. (Prefer area with upwards 5 million tons). State seam and thickness, analysis, amount of coal, height and type of overburden, proximity to railroad and other pertinent data.

BO-254, Coal Age
330 West 42nd St., New York 18, N. Y.

FOR SALE

LIGNITE COAL MINE

located at Garrison, No. Dak., sales 100,000 tons, consisting of the following property owned in fee: 545 acres of land, 7 ft. coal vein, 3 miles trackage, 40-car tipple, 2½ yd. dragline, 1½ yd. shovel, trucks, tractors, miscellaneous tools, shop and equipment.

STEVENS BROS. COAL CO.,
ST. PAUL MINNESOTA

LOCOMOTIVES — 250 VOLT DC

3—15-ton Jeffrey
3—10-ton Goodman
1—15-ton Goodman
3—8-ton General Electric
5—6-ton General Electric

ABOVE LOCOMOTIVES COMPLETELY REBUILT

Frank J. Wolfe

STEEL TIPPLES

Several 3, 4 and 5-track complete Steel Tipples.

MISCELLANEOUS

10—5-BU Joy Loading Machines
2—Joy Elevating Conveyors
1—#3 Myers-Whaley Loading Machine
3—Jeffrey 29-C Arcwall Machines
3—Sullivan CLU Track Cutters.
5—Sullivan CE-7 DC Machines
10—12-AA Goodman 250 volt Machines

ELECTRIC HOISTS FROM 400 TO 1300 H.P. — SLOPE OR SHAFT.

SPOT CASH

FOR COMPLETE MINES GOING OUT OF BUSINESS OR FROM RECEIVERS IN BANKRUPTCY, ADMINISTRATORS OF ESTATES, ETC.

Mail us your inquiries!

COAL MINE EQUIPMENT SALES COMPANY

306-7 Beasley Building L. D. Phone-34 Terre Haute, Indiana

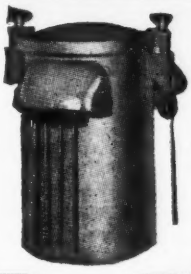
THE APPALACHIAN COAL OPERATOR

WHO WANTS TO GET HIS COAL PERMANENTLY ESTABLISHED NOW FOR THE POST-WAR PERIOD SHOULD ANSWER THIS

Wanted: Exclusive Sales Agency of coal mine in Eastern Kentucky, West Virginia or Tennessee, producing better than average quality and preparation, by a Sales Company with excellent performance record for getting top realization over many years for the mines it represents. Get your coal established NOW with peace-time industries, retailers, utilities, railroads and docks with large normal requirements. Plan for the future *NOW*. All inquiries confidential.

RA-266, COAL AGE
520 N. Michigan Ave., Chicago, Ill.

—TRANSFORMERS—



BOUGHT and SOLD

We have several thousand transformers in stock for prompt shipment, and invite your inquiries.

PIONEER TRANSFORMER REBUILDERS

We rewind, repair and redesign all makes and sizes.

One Year Guarantee

THE ELECTRIC SERVICE CO., INC.

"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
STATION M Since 1912 CINCINNATI 27, OHIO

SELL YOUR SURPLUS EQUIPMENT

IT IS NEEDED TO SPEED THE WAR'S END

DSP INC. ORGANIZATIONS

We have a demand for your surplus and idle equipment—a single item or a complete plant. Send us your list of such equipment—and put it to work where it is needed most.

WE PURCHASE ON A CASH BASIS

DULIEN STEEL PRODUCTS, INC.

of Washington	*of California*	*of New York*
200 NATIONAL BLDG.	11611 SO. ALAMEDA	2280 WOOLWORTH BLDG.
SEATTLE 4, WASH.	LOS ANGELES 2, CALIF.	NEW YORK 7, N. Y.

DIAMOND CORE DRILLING, for any mineral. More than sixty gasoline, steam and electric drills, suitable for any job. **OUR SPECIALTY—testing bituminous coal lands.** Satisfactory cores guaranteed. Prices very reasonable.

HOFFMAN BROS. DRILLING CO.
PUNXSUTAWNEY, PA. Est. 1902 Tel 382

WE LOOK INTO THE EARTH

By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.

PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

WILL PAY CASH FOR

2 Short Wall Cutting Machines

440 Volt A.C. CW.

WIRE

T. O. TOON COAST FUEL CORP.
NORTH BEND OREGON

WANTED

COAL STRIPPING EQUIPMENT

Will buy or lease high lift machinery suitable for stripping soft coal in Penna.

JULIETTE COAL COMPANY
Grant Building Pittsburgh, Pa.

PROMPT SHIPMENT FROM OUR WAREHOUSE

MINING MACHINES

5—12 DA 50 HP 250 v. Goodman Shortwall
36 B Jeffrey 250 v. Low Vein #14318
35 B Jeffrey 250 v. 6' cutter.
2—29 C Jeffrey 250 v. Top Cutters
112 Da Goodman 250 v. 50 HP Universal
3—Low Vein Sullivan CR-2 (250 v.)

STORAGE BATTERY LOCOMOTIVES

2—6 Ton G.E. Permissible Locomotives 36/44" Ga. O.S. armorplate frame. Inside steel tired wheels. 2-HM 825 Ball Bearing Motors. Type LSBE Class 2C6 From C9. 13½' long, 50" high, 69" wide and 44" Wheel base.

Each of the above units equipped with Edison Battery 80 cell A-16—one new in 1940, the other in 1939.

2—5 to 5½ Ton Type D Ironton, 36 or 42" Ga. Low Type, with Exide Battery.
1—4 Ton Jeffrey 42 or 44" Ga. with 2 MH 108 Ball Bearing Motors, Battery Box on top of locomotive.
1—5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing Motors. Battery box on top of locomotive.
4 Ton 36" Ga. Atlas, with Exide Battery.
4 Ton 36" G.E. (2 motors), with Exide Battery.

(Haulage)

18 Ton Westgh. 250 V. 36" or 40" Ga.
1—5 Ton West. 250 V. 36 or 42" Ga. with Electric Gathering Reels. Bar steel frame.
6 Ton Baldwin West. 250 v. 36/42" Ga. #48747 904 Motors outside bar steel frame, inside steel tired wheels.

SCREENS

1—4' x 5' single deck Tyler Hummer Screens Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

MG SETS 3 ph. 60 cy. (Syn.)

150 KW G.E. 250 v. —2200/3/60 900 RPM.
150 KW Ridgway 250 V. DC 2200 V. AC 900 RPM.
100 KW Ridgway 250 V. DC—2200 V. AC 1200 RPM.
75 KW 250 v. G.E. Type DLC G.E. opd. wd. Interpole Gen. dir. con. to G.E. 100 HP Induction Motor 220 or 440 v. 3 ph. 60 cy. 1160 RPM with Starter and DC Panel.

AIR COMPRESSORS

492 cu. ft. 100#C hg. Pneumatic straight line heavy duty Diesel oil driven Compressor unit.

ENGINE GENERATOR SETS

100 KW 250 V. DC Westgh.—Skinner Engine.
50 KW West. 125 V. DC—Skinner Engine.

SLIP RING & SQ. CG. MOTORS (3 ph. 60 cy.)

HP	Make	Speed	Wdg.	Type
500	G.E.	450	S.R.	MT 412
200	G.E.	250	S.R.	MT 412
200	G.E.	600	S.R.	I-M
125	Al. Ch.	435	S.R.	
100	G.E.	500	S.R.	MI-25 cy.
100	Al. Ch.	575	S.R.	
100	West.	900	S.R.	CW.
100	G.E.	1200	S.C.	

PUMPS

250 GPM 250# or 575' Head 2 cyl. Hor. National Transit 6" suc. 4" dia. enclosed driven by 40 HP Motor.

HOISTS

500 HP Connellsville Sgl. drum slope Hoist complete with AC Motor and contactor control.
75 HP Lidgerwood sgl. fr. drum
50 HP Diamond 2 drums same Shaft
30 HP Clyde sgl. drum AC Motor
30 HP Double drum—Tandem
15 HP Lidgerwood sgl. dr. AC Motor

400 TRANSFORMERS (Westgh. & GE 1 ph.)

Qu.	KVA	Pri. V.	Sec. V.
40	5	2080 2200	115/230
31	7½	"	"
28	10	"	"
2	25	2200	244/488
3	50	2000	2000

AC AIR BREAKERS (unused)

8—200/400 amp. 3 pole ITE 220 v.
2—300/600 amp. 3 pole ITE 220 v.

COAL CRUSHERS

18" x 24" Double roll New.
18" x 30" Double roll New.

SYNCHRONOUS MOTORS

HP	Make	Voltage	Speed	Type
200	West.	2200	900	
150	G.E.	2200	900	ATI

Each of the above has a dir. con. exciter.

MOORHEAD-REITMEYER CO., INC.
PITTSBURGH, PENNSYLVANIA

ELECTRIC LOCOMOTIVES

1—10 ton G.E. steel frame, 250 V.H.M. 830-A motors.
1—8 ton Goodman steel frame, 250 V. Type 3104-T. 42" gauge.
1—6 ton Jeffrey, with MH-88 250 V. motors and reel.
1—6 ton West. bar steel frame with 904-C 250 V. motors.
1—5 ton G.E. ready to operate. 42" gauge.
2—5 ton Goodman 250 V. 36" gauge.

COAL CUTTING MACHINES

2—35 B Jeffrey 250 V.
1—35 BB Jeffrey, 500 V.
1—35 BB Jeffrey 250 V.
1—35 BB Jeffrey A.C.
2—124 EJ Goodman, 50 HP, 250 V. permissible track mounted slabbing machine.
1—12DA Goodman, 50 HP, 250 V. D.C.
1—12 G3 Goodman shortwall, 3/60/220 V.
1—12AB Goodman shortwall, 250 V. D.C.
1—36B Jeffrey 250 V. longwall.
1—90 L Goodman Elevating Conveyor.

MOTORS AND GENERATORS

1—100 KW West. compound wound D.C. generator, 250 V.
1—100 KW Rotary Converter, 275 V. D.C. with 2300-4000 V. transformers.
1—600 HP Allis-Chalmers Syn. 3/60/2200 V.
1—165 HP G.E. Syn. 2200 V. 900 RPM.
1—15 HP G.E. ball bearing 3/60/220

We have a complete line of D.C. motors.

Send us a list of any equipment you may have for sale.

TIPPINS MACHINERY COMPANY
Pittsburgh, 13, Pa.

RAILS NEW AND RELAYING

TRACK ACCESSORIES
from 5 Warehouses

- PROMPT SHIPMENTS
- FABRICATING FACILITIES
- TRACKAGE SPECIALISTS

EVERYTHING FROM ONE SOURCE

L. B. FOSTER COMPANY
PITTSBURGH • CHICAGO • NEW YORK

RAILS—CARS

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches and ties.

M. K. FRANK

No. 6 Blitz Bldg. Reno, Nevada
New York, N. Y.
810 Park Bldg., Fifth Avenue Pittsburgh, 22, Pa.
Carnegie, Pa.

RELAYING RAILS

TRACK MATERIALS
RAILWAY EQUIPMENT
QUALITY—SERVICE—PRICE

E. C. SHERWOOD 50 Church St. New York

MINING MACHINES

AC & DC

REBUILT & GUARANTEED FOR IMMEDIATE SHIPMENT

New Electric Coal Drills for AC and DC
Mine Fans, Tipple Scales, etc.
2—Ironton 5-ton Storage Battery Locomotives.

Equipment of all kinds
Buy, Sell or Exchange

THE INDUSTRIAL EQUIPMENT CORP.
Warehouse: Carnegie, Pa.
P. O. Box 1647 Pittsburgh 30, Pa.

★ MINING EQUIPMENT READY FOR DELIVERY ★

CUTTING MACHINES

1—212-AA Goodman Low vein, 250 volt
1—312-AA Goodman Low vein, 250 volt
2—35-1 Jeffrey Low vein, 250 volt
3—12-AA Goodman Standard, 250 volt
2—12-AA Goodman Standard, 500 volt
1—112-AA Goodman Universal, 250 volt
1—28-A Jeffrey, 250 volt
1—28-A Jeffrey, 500 volt
1—29-C Jeffrey, 250 volt
1—29-B Jeffrey, 250 volt

LOCOMOTIVES

All 250 volt

10-Ton Jeffrey, MH-110, 44" gage, inside frame
10-Ton Jeffrey, MH-78, 42 or 44" gage, outside frame
13-Ton Westinghouse 79, 48" gage
8-Ton Westinghouse 65, 44" gage
6-Ton 30-B Goodman, 42 to 48" gage
4-Ton Jeffrey, MH-96, 48" gage
4½-Ton Ironton, low vein with G.E. cable reel

MISCELLANEOUS

1—Link Belt Loading boom 42" wide, 44' long
1—Pan conveyor 26" wide, 44' long
1—Fig. 8 Incline rope drum, for 1" rope
3—Goodman Duckbills
1—100-KW. West. SK Compd. wound Generator, 250 volt
1—Westinghouse YR-4 cable reel
1—100-HP. Natural gas engine with 220 volt A.C. Generator and complete switchboard equipment

Transformers, Hoists, Tipple equipment, A.C. and D.C. motors, and miscellaneous coal mining and industrial equipment.

LET US KNOW YOUR NEEDS—WE BUY, SELL, AND TRADE

ALL-STATE EQUIPMENT CO. INC.
LOGAN, W. VA., PHONE 884

LOCOMOTIVES

1—7-Ton Gas Locomotive, 36" Ga., Milwaukee Locomotive Works
1—9-Ton Gas, 36" Ga., Whitcomb
1—8-Ton 0-4-0 Vulcan, S/G Ex. Cond.
2—25-Ton 0-4-0 Porter Saddle Tank Locos. Oil Burners: A.S.M.E. Code. Excel. Cond.
1—50-Ton 0-6-0 Vulcan Locomotive
1—65-Ton 2-6-0 Mogul Loco. Oil-burning.
1—70-Ton 0-6-0 Baldwin Switching Loco. ICC condition
1—70-Ton Baldwin-Westinghouse Electric Loco., 600 volt D.C.
1—70-Ton Gas-Electric Locomotive
1—70-Ton G.E. Battery Loco. Excellent Cond.
1—80-Ton 0-6-0 Lima Switching Loco. Excellent condition

Other Locomotives, Too

IRON & STEEL PRODUCTS, INC.
39 years' experience
13484 S. Brainard Ave., Chicago 33, Ill.
"ANYTHING containing IRON or STEEL"

FOR SALE

Saddle Tank Locomotive, American Make, 20 ton, standard gauge, coal burner, 4 drives, 30 inch, type T 53. Condition good. Location St. Louis. Also have Bull and Angle dozers suitable for stripping. Low prices.

O. C. EVANS, Mt. Sterling, Ky.

6 YD. or 8 YD. STRIPPER SHOVEL

225 Bucyrus 80 ft. Boom, 54 ft. Dipper Stick, Steam Shovel.

3 WALKER DRAGLINES

4 Yd. Monighan 90' Boom Diesel.
2W Monighan 60' Boom Diesel.
2 Yd. Monighan 60' Boom Elec.

16 YD. DRAGLINE:
1—16 Yd. Electric Caterpillar Modern Dragline with 160' Boom

AIR COMPRESSORS:
(7) Steam 66 ft., 300 ft., 600, 1000 & 1940 ft.
(12") Belted, 360, 676, 870, 10000, 1300 ft.
(12) Diesel 105, 315, 520, 676 & 1000 ft.
(6) Electric, 1300, 1500, 2200, 2000, 5000 ft.
(14) Gasoline, 10, 160, 220, 310 & 370 ft.

RUBBER CONVEYOR BELTS:
1000' 60", 600' 30", 300' 20", 1000' 42", 900' 48", 1450' 36", 1200' 24", 900' 18", 600' 16", 350' 14"

TANKS:
12,000 and 15,000 gal. and 20,000 gal.

CONVEYOR PARTS:
Idlers, Heads & Tail Pulleys, Steel Frames, Tripper, etc., 14 In., 6 In. Large stock here.

STORAGE BATTERY LOCOMOTIVES:
2½ ton Witcomb 24 ga. New Batteries
2—4 ton G.E. 30 in. ga.
3—5 ton Mancha 30 in. ga.
4—5 ton G.E. 36 in. ga.
3—7 ton Goodman 36 ga. Battery & Trolley
8—6 ton Baldwin Westgh. 42 ga. & 36 ga.

TRACK SCALE:
150 Ton Buffalo 56 ft. R.R. Track Scale

TROLLEY LOCOMOTIVES:
2½ ton Westinghouse 24 ga.
4—6 ton & 3—5 ton Goodman 36 ga.
3—6 ton Goodman 30 ga.
4—6 ton Goodman 42 ga.
5—6 ton Westinghouse 42 ga.
2—8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey

VIBRATING SCREENS:
9 Tyler Hummer 3x6, 4x5, 4x8 & 4x10
2 Robins Gyrex 4x8½
4x12 Niagara, 3x8 L. B., 5x6 Simplex

CARS:
60—Western 16-20-30 yd. Side Dump

SHOVELS, CRANES & DRAGLINES:
1 yd. K 30 Link Belt 50' Boom Crane
2 yd. Page 70' Boom Diesel Dragline
1¼ yd Marion 450 Elec. Shovel
1¼ yd. Lima Diesel Shovel & Dragline
25 ton Browning 50' Boom Loco. Crane

MINE LOADERS:
Junior Joy 36 ga. Low Pan
3—5 BU & 7 BU & 12 BU 36 or 42 ga. Joy
7 Conway 20A, 30A, 50A, 60 & 75 Muckers

MISCELLANEOUS:
5'x60' Traylor Rotary Dryer
Clamshell Buckets ¾; 1, 1½ & 2 yd. Cap.
30 ton & 12 ton Vulcan St. Ga Gas. Loco.

WANTED TO BUY:
Complete Mines—M.G. Sets, Locomotives, Compressors, Conveyors, Cranes, Crushers, Mine Loaders

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

STORAGE TANKS

Large quantity available from Tank Cars. 8000 and 10000-Gallon capacities
Cleaned—Tested—Painted

Suitable for Storing Most Kinds of Liquids!

Whole tank cars too for mobile storage.

Send us your inquiries for other sizes also!

IRON & STEEL PRODUCTS, INC.
39 years' experience
13484 S. Brainard Ave.
Chicago 33, Illinois
"ANYTHING containing IRON or STEEL"

IRON and STEEL PIPE

New and Used

Large stocks, all sizes attractive prices

L. B. FOSTER COMPANY
P. O. Box 1647 Pittsburgh 30, Pa.

FOR SALE
STEEL TANKS—STEEL BUILDINGS
All sizes and kinds
Guaranteed used steel pipe
Valves and fittings
All items at various points
JOS. GREENSPON'S SON PIPE CORP.
Natl. Stock Yds., St. Clair Co., Ill.

FOR
IMMEDIATE DELIVERY OF RUBBER PRODUCTS

Conveyor Belting...Transmission Belting...Elevator Belting...Fire, Water, Air, Steam, Suction or Welding Hose, etc.

CALL, WIRE or WRITE
CARLYLE
THE RUBBER HEADQUARTERS

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"
42"	5	1/8"	1/16"
36"	6	1/8"	1/16"
30"	6	1/8"	1/16"
30"	5	1/8"	1/16"
24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
12"	4	1/16"	1/32"

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices - Mention Size and Lengths

ENDLESS "V" BELTS

"A" WIDTH All Sizes | "D" WIDTH All Sizes
"B" WIDTH All Sizes | "E" WIDTH All Sizes
"C" WIDTH All Sizes | Sold in Matched Sets

Inquire For Prices - Mention Size and Lengths

PROTECT THAT PLANT
FIRE HOSE

APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

SPECIAL OFFER . . . HEAVY DUTY
RUBBER HOSE

WATER HOSE
Each Length with Couplings Attached

I.D. Size	Length	per Length
¾"	25 feet	$4.25
1"	50 "	8.00
	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

LARGER SIZES ALSO AVAILABLE
All Prices—Net—F.O.B. New York

CARLYLE RUBBER CO., INC.
62-66 PARK PLACE NEW YORK, N. Y.

PIPE—MACHINERY—GAS ENGINES
AIR COMPRESSORS—DIESELS—PUMPS

Some Steam Engines and Boilers available only slightly above the metal price

BRADFORD SUPPLY COMPANY
WAYNE, WOOD COUNTY, OHIO Near Toledo

PIPE New & Reconditioned

ALL SIZES for ALL PURPOSES
Cut and Threaded to Your Specifications
VALVES AND FITTINGS
UNITED PIPE & SUPPLY CO., NORRISTOWN, PA.

LOCOMOTIVES

Goodman: All 250 volts.
1—10 ton, 31-1-4-T.
1— 6 ton, 30B, '43" 1—5 ton.
1— 5 ton, W-1-2, 36".
2— 5 ton, 2600 K.
1— 6 ton, 33-1-4-T.
2— 8 ton, 32-1-4-T.

Westinghouse: All 250 volt.
1—4 ton, 902, 48" 1—13 ton, 102, 42"
1—904 c. 44" 500 volt. Also 906 motors.
1—10 ton, 915.
Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt. 4 ton 1022, 44" as is
6 ton 803, 44", as is 5 ton 825, 44"
6 ton 823, 44" 8 ton 839 motors
6 ton 801
8 ton 839

Jeffrey: 6 ton, and 4 ton, all gauges, 250 volt
1—**Jeffrey** MH 100, frame only.

MINING MACHINES

Jeffrey, 35B and 4—28A, 250 V. 4—29B 29C with shearing head.

Goodman, 12A, 12AB, 12AA, 12G3A, 24B
1—12G3 250 volt and 2—112 DA, 500 volt.
2—Permissible Type 12CA. 6—112AA,
3—124AA.

Sullivan, CE7, CE9, CE10, CR10 Low Vein. CR5 for middle cutting.

SUBSTATIONS—275 volts, D. C.

2—200 KW **G.E.** Rotaries (600 volt)
1—200 KW **Ridgway** M.G. Set.
2—150 KW **West.** Rotary.
1—200 KW 1—100 K **Ridgway** M-G Sets.
1—100 KW **West.** M-G Sets.
2—100 KW **G.E.** Rotary.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73, 29B, 35B and 28A. **Goodman** 34B, 30B, 30C, 12A, 12AB, 12AA 33-1-4-T, 31-1-4-T. **General Electric** 801, 803, 819, 821, 825, 839. **Westinghouse** 904, 906, 102, 907, YR2, 115. Also 200 KW **Westinghouse Rotary Converter Armature,** 250 V. Bracket Type, 150 KW G.E. HCC Bracket Type, and 150 KW G. E. TC Pedestal Type.

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE * COMPRESSORS * DUMPS * SPEED REDUCERS FIELD FRAMES * ARMATURES * GOODMAN HYDRAULIC SHOVELS * MOTOR STARTERS AND CONTROLLERS—AC & DC * DROP BAR SUPPORTS (Gooseneck), 29B and 29C * MINING MACHINE TRUCKS * SWITCHBOARDS * CIRCUIT BREAKERS—AC & DC * CONVEYOR HOISTS * COAL CRUSHERS (double roll) 12"x16", single roll 24"x36", 36"x36" CONVEYOR HOISTS, 24"x24" and 18"x16" * TURBO-GENERATOR 500 K.W. 275 volt DC * ROPE & BUTTON CONVEYOR 400' long LATHES, SHAPERS * SWITCHES * AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps * MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps * HOISTS, overhead, AC, 3-60-440, 1 ton and 2 ton * CAR RETARDERS, Fairmont * 1 Clam shell bucket 1¾ cubic yard, 1—Figure 8 drum * MINE CARS 2 SULLIVAN BIT SHARPENERS * R.R. SWITCHES 85# to 100# HOISTS 5 HP AC and DC GENERATORS DC 250-275 volt, 30 KW to 100 KW. Also 50 KW 125 volt direct connected to steam engine. Goodman Scraper Loader.

GUYAN MACHINERY COMPANY, Logan, W. Va.

FOR SALE

Lima 2½ yard Diesel Dragline
Marion 351 Shovel & Dragline, 1¼ yard, gas
P & H 650 Shovel and Crane
Buc. Erie GA-2 Shovel, gas
General ½ yd. Diesel Crane
Universal 7½ ton Crane on Mack Truck, rebuilt
Lorain 45 Crane-Shovel, ¾ yd.
Lorain 75-B, 1½ yd. Shovel-Crane
Northwest Model 3 Shovel-Backhoe
Conway Mucker "75", 36" gauge
2—Conway Muckers "50", 36" ga. rebuilt
Buc. Erie 50B Steam Shovel-Crane 2 yds.
Marion Model 37 Steam Shovel, 1¾ yds.
Koehring 301, ¾ yd. Shovel & Crane
Buc. Erie Steam Dragline, 6-8 yds. 175' bm.
Moore Speedcrane 15 tons, gas. 63' boom
Speeder ½ yd. Backhoe
Ind. Brownhoist Crane, gas. 40' boom, 1 yd.
Allis Chalmers "L" Tractor with bulldozer
Allis Chalmers "K" Tractor with bulldozer
Int. T35 Tractor with Angledozer
Int. T35 Tractor with Angledozer
Caterpillar D35 Tractor with bulldozer
Allis Chalmers "30" Tractor with bulldozer
Jaw Crushers: 12x26, 13x30, 14x28, 16x32
Gyratory Crusher, Superior-McCully 30"
Gyratory Crusher, Traylor Type T, 12"
Mundy 35 H.P. double drum gas Hoist
National 100 H.P. dbl. drum Dragline Hoist, elec.
Baldwin 78 ton Side Tank Locomotive
American 75 ton Locomotive, steam. Rebuilt
American 45 ton Saddle Tank Switcher
Vulcan 30 ton Steam, std. gauge Saddle Tank loco.
Vulcan 25 ton Steam, std. gauge Locomotive, side tank
Vulcan 20 ton Gas, std. gauge Locomotive, rebuilt
Whitcomb 14 ton, 36" gauge Diesel Loco.
Davenport 10 ton, std. gauge, gas Loco.
Vulcan 6 ton, 36" gauge, gas Locomotive
Steel Storage Bin 200 tons, ¾" plating
I. R. 1302 CFM., 2 stage Air Compressor
I. R. 1050 CFM., 2 stage Compressor, gas drive
Bucket elevator, belt, 22", buckets, 35'
Haiss ¾ yd. Clam, rehandling Bucket
Erie ¾ yd. Clam, rehandling Bucket
Blaw-Knox ⅞ yd. Clam, digging Bucket
Hayward ⅞ yd. Clam, digging Bucket

RICHARD P. WALSH CO.
30 Church St. New York 7, N. Y.

Slip Ring Motors

Qu.	H.P.	Make	Type	Volts	RPM
1	20	A-C		440	1150
1	30/15	G.E.	OMT	440	1150/550
3	35/15	G.E.	OMT	440	1150/550
3	50	G.E.	OMT	440	1150
1	50	Ideal	AV	2200	575

Squirrel Gage Induction Motors

Qu.	H.P.	Make	Type	Volts	RPM
1	15	West.	CS	220	1160
1	15	West.	CS	440	1155
1	20	A-C		220	860
2	25	A-C	AN	440	1150
1	40	A-C		2200	860

Other Items In Stock

1—½ to 30 HP, D.C. Motors
1—I/R Portable Type Air Compressor
150—5 Ampere, 110 Volt, 2 Wire Meters
1—200 K.W. 600 Volt, G.E. Converter
3—165 KVA, G.E. Rotary Transformers

District Representatives For I-T-E Automatic Reclosing Circuit Breakers.

R. H. Benney Equipment Company
Norwood 12, Ohio

MINE HOISTS

1—Ottumwa Band Friction 36" will coil 3500 ft. ⅞" rope. 125 HP Motor.
1—Lidgerwood Cone Friction 42" will coil 2500 ft. ⅞" rope. 100 HP Motor.
1—Vulcan Band Friction Two Drum 54" 150 HP Motor
1—Flory-Keyed Drum 52" will coil 2000 ft. 1" rope. 150 HP Motor.
1—Vulcan Sliding Pinion 60" will coil 3500 ft. 1" rope. 200 HP Motor.
1—Vulcan-Cylindro Conical Shaft Hoist 350 ft. 1⅜" rope. 400 HP Motor.
1—Connellsville-Cylindro Conical Shaft Hoist 250 ft. 1½" rope. 800 HP Motor.

And other hoists to suit all mining conditions

Jones Mining Equipment Co.
541 Wood Street Pittsburgh, Pa.

COAL MINE EQUIPMENT

ELECTRIC HOISTS
1—80 HP Ottumwa, Single Drum
1—150 HP Ottumwa, Single Drum
2—200 HP Ottumwa, Single Drum
(or can be furnished as divided drum)

ELECTRIC LOCOMOTIVES
4—6½-Ton General Electric 250 Volt.
1—6-Ton Jeffrey, 250 Volt.
1—7-Ton Mancha, Battery Type.
1—6-Ton Westinghouse-Baldwin, Battery Type.
1—5-Ton Mancha, Battery Type.

LARGE MOTORS
2—500 HP G. E. 2200 Volt, 1800 RPM.
1—250 HP Fairbanks, Slip Ring, 440 Volt, 1200 RPM.
2—200 HP G. E., 440 Volt, 450 RPM.
1—200 HP G. E., 440 Volt, 345 RPM.

MINE PUMPS
2—6" Manistee—8-Stage, Motor Driven, capacity 900 GPM, 1150' head.
1—5" Cameron—6-Stage Motor Driven.

BOILER STACK
1—9' Diameter x 175' Self-Supporting Steel Stack.

Above are only a few items of our stock.
—Write for Complete Stock List No. 441—

Morse Bros. Machinery Company
P.O. Box 1708 Denver 1, Colorado

FOR SALE

Hydrotator Company air-sand Coal Cleaner; 10 foot Separator complete with blower and de-sanding screens. Capacity 100 tons per hour. Used only four months. For complete information write:

ALLEGHENY RIVER MINING CO.
Purchasing Department
Shawmut Building Kittanning, Penn.

SCALES—FOR SALE

1—Railroad Scales—125 Ton rebuilt condition—used Scale
1—Truck Scale—20 Ton, Rebuilt
1—Truck Scale—15 Ton, Rebuilt
1—Warehouse Scale—Used

New SCALES IN STOCK
IMMEDIATE SHIPMENT

Winslow Scale Co.
Terre Haute, Indiana Phone N. 2205

NEW "SEARCHLIGHT" ADVERTISEMENTS

received by August 25th, appear in the September issue, subject to space limitations.

Address copy to the Departmental Staff

Coal Age
330 West 42nd St.,
New York City 18, N. Y.

REBUILT EQUIPMENT—READY TO SHIP

AUTOMATIC RECLOSING CIRCUIT BREAKERS

1—300 Amp. 275 volts, type RBI, serial No. 6193.
1—400 Amp. 275 volt, type CRL, serial No. 6327.
1—400 Amp. 275 volt, type ARL, serial No. 7530.
1—600 Amp. Class I, type AHD, 275 v. Ser. No. 8051.

MINING MACHINES—250 v. DC

1—CE-7 Sullivan 36" ga. 1—Sullivan 5B Buddy.
2—Armatures for CE-7 Sullivan 250 v. D.C.

MINE LOCOMOTIVES

1—3½ ton Ironton Battery 36" ga.
5—5 ton Goodman 30 B, 250 v. 36" ga.
4—5 ton Goodman 2600R Gathering Locomotives, 250 v. DC 42 or 44" ga. with cable reels.
2—7 ton Goodman 32-0-4-T 250 v. 36" ga.
1—10 ton Milwaukee Gasoline.
1—10 ton West. 500 v. 40" ga.
1—10 ton Goodman Locomotive, 250 v. 42" ga. cast iron frame, inside wheels.
1—13 ton Westinghouse 42" ga. 250 v. Locomotive, cast iron frame, two motor type, single end control.

DIESEL ENGINE GENERATOR SET

1—75 KW, 250 v. DC, type SK Westg. Gen. belted to 100 HP Buckeye Horiz. Diesel.

CENTRIFUGAL PUMPS

2—1000 GPM Cameron bronze, 100' hd.
1—800 GPM Weinman 90' hd. 6 x 5.
1—1000/1200 GPM Weinman Cent. single stage Pump, 6" suc. 5" dis. 150 ft. hd. 75 HP 1750 rpm. Motor.

MOTOR GENERATOR SET

150 KW Ridgeway 250 v. DC, 900 rpm., 2200/3/60, syn.
1—300 KW West. 550 v. DC 1200 rpm. 2200 v. 3/60 complete with AC and DC swb; also automatic reclosing circuit breaker.

TRANSFORMERS—1 ph. 60 cy.

No	Kva	Pri	Sec	Make
1	100	2200	110/220	G.E.
3	100	6600	550/440/220	Pgh.
3	50	11430/6600	550	Al. Ch.
3	50	6600	575	G.E.
3	50	Westg.	4000/2200	230/460
1	37½	2300	220/440	Wagner
3	37	4400	185	West. (Rotary)
35	10	2200	110/220	G.E.
100	7½	2200	110/220	G.E.
75	5	2200	110/220	West.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
300	G.E.	440	900	I
260	Burke	440	600	EMV-65
150	G.E.	220	375	I-8
150	West.	CW	220/440	490
150/75	West.	CW	220/440/2200	580/290
100	West.	CW	220	490
100	G.E.	I	220	450
100	G.E.	2200	450	I-M
75	Westg.	220/440	690	CW
75	West.	CW	220/440/2200	580/290
50	Chand.	220/440	1800	

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.

HP	Make	Type	Volts	RPM
50	G.E.	220/440	1200	HI
50	Allis Chal.	220	490	
50	Westg.	440	1150	CW636A
50	G.E.	OM-7	220/440	1160/560
40 to 50	Westg.	440	1150	CW
20	Westg.	220	1735	CW

230 V. DC MOTORS

HP	Make	RPM	Type
¾	Cr. Wh.	850	EL
1	Louis Allis	1150	INA
1½	Westg.	2200	SK
1½	Westg.	1000	CD
1½	West.	900	SK
1½	Robbins-Myers	1750	
2	Thompson	1100	
3	Robbins-Myers	1750	S
3	Westg.	850	SK
4	Westg.	1180	
5	Robbins-Myers	1750	
5	Robbins-Myers	875	
5	Imperial	540	SK
5	Westg.	850	
5	Westg.	1600	RC
5	Lincoln	1300	
7½	Cr. Wh.	875	
10	Robbins-Myers	1750	S
10	Allis Chal.	1200	
15	G.E.	850	RC
20	G.E.	925	CQ-15
30	Westg.	1025	S-7
35	G.E.	900	DLC
40	Westg.	950	SK-130
175	West.	320	S
300	Otis	550	

(With spare armature)

ROTARY CONVERTERS

500 KW G.E. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V., Transformers.
500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V., Transformers.
500 KW WEST. SYN 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V., Transformers.
300 KW G.E. SYN 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
150 KW G.E. SYN. 275 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
150 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

200 KW G.E. IND., 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM. Manual Switchgear.
200 KW R.W. SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM. 80% P.F. Manual Switchgear.

LOCOMOTIVES

13-T WESTGHE., 250 V., 908-C Mts., 36" Ga.
13-T GOODMAN, 250 V., 36-A Mts., 36"-42" Ga.
10-T WESTGHE., 250 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHE., 500 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHE., 250 V., 906-C Mts., 36"-44" Ga.
8-T WESTGHE 500 V., 906-C Mts., 36"-44" Ga.
8-T GEN. ELEC., 250 V., 839 Mts., 36"-48" Ga.
6-T WESTGHE., 250 V., 904-C Mts., 36"-48" Ga.
6-T Gen. Elec. 250 V., 823-A Mts. 36"-44" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK COMPANY
Incorporated
501 Grant Building Pittsburgh, Pa.

A GOOD INVESTMENT!

For the Duration or Postwar

SAVE

demurrage,
switching,
extra handling costs,
damaging foreign cars, etc.

Which of these cars could you use?

85, Hopper, Double, 50-Ton
10, Hopper, Side-Discharge, 50-Ton
150, Refrigerator, 40-Ft., 40-Ton
16, Refrigerator, 36-Ft., 30-Ton
15, Ballast, Composite, 50-Ton
25, Box, 36-Ft., 40-Ton
3, Dump, Koppel, 20-Yd., 40-Ton.
20, Dump, K & J Automatic, 16-Yd., 40-Ton
20, Flat, 40-Ft., 50-Ton
38, Gondola, Composite, 36-Ft. & 40-Ft., 40-Ton
9, Gondola, Steel, 50-Ton, High-Side
30, Tank, 8000-Gallon, 40 & 50 Ton

All cars are priced to sell!

IRON & STEEL PRODUCTS, INC.
39 Years' Experience
13484 S. Brainard Ave., Chicago 33, Illinois
"*ANYTHING* containing IRON or STEEL"

LATHES

36"x18' Schumacher Boye Triple Geared.
22"x10' LeBlond 3 S.C.D. Q.C.
26"x16' Pittsburgh, 3 S.C.D. Q.C.

SHAPER

20" Columbia Heavy Duty, Cone.

CINCINNATI MACHINERY & SUPPLY COMPANY
218 E. Second St., Cincinnati, Ohio

A DEPENDABLE SOURCE
for
HEAVY EQUIPMENT
CARS — CRANES — COMPRESSORS
DRAGLINES — LOCOMOTIVES
SHOVELS—TRACTORS—ETC.
WE WELCOME YOUR INQUIRIES
WE WILL FIGURE WITH YOU ON YOUR SURPLUS

B. M. WEISS CO.
Girard Trust Bldg. Phila, Pa.

POWER EQUIPMENT COMPANY
MOTORS—MOTOR GENERATOR SETS
TRANSFORMERS
AIR-OIL CIRCUIT BREAKERS
CONTROLS
NEW REBUILT

519 CASE BLD.
ST. PAUL AV.
ROCHESTER I, N. Y.
Telephone 569

MOTOR GENERATOR SET

150 KW Westinghouse Synch. MG Set 275/2300 V.
Transformers Controllers

D.C. & A.C. MOTORS

35B Jeffrey Permissible Mining Machine 250 V.
Switchboards Built to Order

John D. Crawbuck Co. Zone 22 Pittsburgh, Pa.

NEW and REBUILT
STORAGE BATTERY
LOCOMOTIVES
1½ to 10 Ton—13" to 56" Track Gauge
GREENSBURG MACHINE CO.
Greensburg, Penna.

HOISTS

1—Ottumwa double drum, single gear reduction Electric Shaft Hoist, complete, in first-class condition, with 60 horsepower, 600 revolution, 220 volt, 3 phase, 60 cycle, General Electric motor.

LESLIE E. BRYANT
Clarksville, Arkansas

COAL AGE ADVERTISERS IN THIS ISSUE

An asterisk preceding manufacturer's name indicates detailed information may be found in the 1943 *COAL MINING CATALOG*

*Air Reduction Sales Corp. 181
Allen & Garcia Co. 34, 35
Allen-Sherman-Hoff Co. 113
*Allis-Chalmers Mfg. Co. 8, 9
Allis-Chalmers, Tractor Division . . . 67
Allis Co., Louis, The Insert between pp. 60, 63
*American Cable Div. of American Chain & Cable Co. . . . . Third Cover
*American Brattice Cloth Co. 170
American Cyanamid & Chemical Corp. 37
American Crucible Products Co. . . . 162
American Marsh Pumps Co. 189
*American Mine Door, Co. 189
*American Pulverizer Co. 159
Anaconda Wire & Cable Co. 109
Atlas Powder Co. 20

*Barber-Greene Co. 186
Bemis Bros. Bag Co. 152
*Bethlehem Steel Co. 18
Bituminous Coal Institute. 185
*Bixby-Zimmer Engrg. Co. 168
Bristol Co. 174
Broderick & Bascom Rope Co. 145
*Brown-Fayro Co. 131

Carboloy Co., Inc. 158
Cardox Corp. 29
*Central Mine Equipment Co. 7
*Centrifugal & Mechanical Industries, Inc. 133
Chicago Perforating Co. 193
*Chicago Pneumatic Tool Co. 36
Christie Co., L. R. 196
*Cincinnati Electrical Tool Co. 195
*Cincinnati Mine Machinery Co. 120
*Continental Gin Co. 192
Crane Co. 58
Cummins Engine Co. 65

*Deister Concentrator Co. 156
*Deister Machine Co. 168
Deming Co. 188
*Differential Steel Car Co. 161
.Dings Magnetic Separator Co. 176
duPont de Nemours & Co., E. I. (Explosives Div.) 40
duPont de Nemours & Co., E. I., (Grasselli Chemical Div.) 25

*Edison Storage Battery Div. of Thomas A. Edison, Inc. 38
*Electric Storage Battery Co. 103
Ensign-Bickford Co. 74
Euclid Road Machinery Co. 163

Flexible Steel Lacing Co. 189
*Flocker & Co., John. 172
Flory Mfg. Co. 195

Galigher Co. 166
Gardner-Denver Co. 169
Gates Rubber Co. 52
General Cable Corp. 26, 27
*General Electric Co. 30, 31, 138
Goodman Mfg. Co. 16, 17
Goodrich Co., B. F. 1
Goodyear Tire & Rubber Co. 15
*Gorman-Rupp Co. 195
Gould Storage Battery Co. 68
*Goyne Steam Pump Co. 193
*Gruendler Crusher & Pulverizer Co. 191
Gulf Oil Corp. 111
Gulf Refining Corp. 111
Guyan Machinery Co. 162

Hammond Co., J. B. 191
*Hardinge Co. 64
Harnischfeger Corp. 41, 137
Hazard Insulated Wire Works. . . . 107
Hendrick Mfg. Co. 195
Hercules Powder Co. 153
Holmes & Bros., Robert. 147
Hulburt Oil and Grease Co. 2, 3

*Indiana Foundry Co. 195
International Harvester Co. 60
I. T. E. Circuit Breaker Co. 14

*Jeffrey Mfg. Co. Insert between pp. 20-25
Jones & Laughlin Steel Corp. 173
*Joy Mfg. Co. 72, 73

*Keystone Electric Co. 151
Koehler Mfg. Co. 157
Koehring Co. 44

*LaDel Conveyor & Mfg. Co. . . . 54, 55
LaPlant-Choate Mfg. Co. 177
*Laughlin Co., Thomas. 150
*Leschen & Sons Rope Co., A. 119
*Link-Belt Co. . . . . Fourth Cover
Lombard-Governor Co. 191

Macmillan Petroleum Corp. 127
Mack Trucks, Inc. 175
Macwhyte Co. 184
Manhattan Rubber Co. 139
Marion Steam Shovel Co. 63
Marlo Co. 178
Mayfair Hotel 176
McGraw-Hill Book Co. 188, 190
McLanahan & Stone Corp. 196
*McNally-Pittsburgh Mfg. Co. Insert between pp. 40-45
*Merrick Scale Mfg. Co. 178
Mine Safety Appliances Co. 123
Morrow Mfg. Co. 53
Mosebach Electric & Supply Co. . . . 174
*Mott Core Drilling Co. 178
*Myers-Whaley Co. 39

*National Malleable & Steel Castings Co. 160
*National Powder Co. 134
Naylor Pipe Co. 142
New Departure, Div. of General Motors Corp. 105
*Norma-Hoffman Bearings Corp. . . . 179

Ohio Brass Co. 19
Osmose Wood Preserving Co. of America, Inc. 28

Paris Mfg. Co. 172
Philco Storage Battery Div. 4
*Pittsburgh Knife and Forge Co. . . . 178
Pomona Pump Div., Joshua Hendy Iron Works. 143
Post-Glover Electric Co. 160
Pressed Steel Car Co. 148
Prox Co., Frank, Inc. 182

*Robins Conveyors, Inc. 187
Rochester Ropes, Inc. 71
*Rockbestos Products Corp. 165
*Roebling's Sons Co., John A. . . . 59, 144
Rome Cable Corp. 45

SKF Industries, Inc. 70
Salem Tool Co. 176
*Sanford Day Iron Works Co. . . . 32, 33
*Schramm, Inc. 140
Searchlight Section 196-201
Sheppard Co., R. H. 183
Sinclair Refining Co. 50
Socony Vacuum Oil Co. 115
Standard Oil Co. (Indiana) 117
Stearns Magnetic Co. 155
Stephens Adamson Co. 57
*Sturtevant Mill Co. 146
*Sullivan Machinery Co. 10, 11
Sun Oil Co. . . . . Second Cover

Texas Co. 12, 13
Thermoid Co. 141
Thornton Tandem Co. 129
TideWater Associated Oil Co. . . . 46, 47
*Timken Roller Bearing Co. 66

United Engineers & Constructors, Inc. 154
United States Rubber Co. 48
Upson-Walton Co. 56

Viloco Railway Equipment Co. 190
*Vulcan Iron Works (Wilkes-Barre) 51
Vulcan Iron Works (Denver) 193

Walter Motor Truck Co. 69
Walworth Co. 6
*Weir-Kilby Corp. 164
Westinghouse Air Brake Co., Ind. Div. 125
Westinghouse Electric & Mfg. Co. . 49
*West Virginia Steel & Mfg. Co. . . . 166
*Wickwire Spencer Steel Co. 149
Wood's Sons Co., T. B. 171
Wyandotte Chemicals Corp. 164
Wyckoff & Son Co., A. 196

■

PROFESSIONAL SERVICES 180

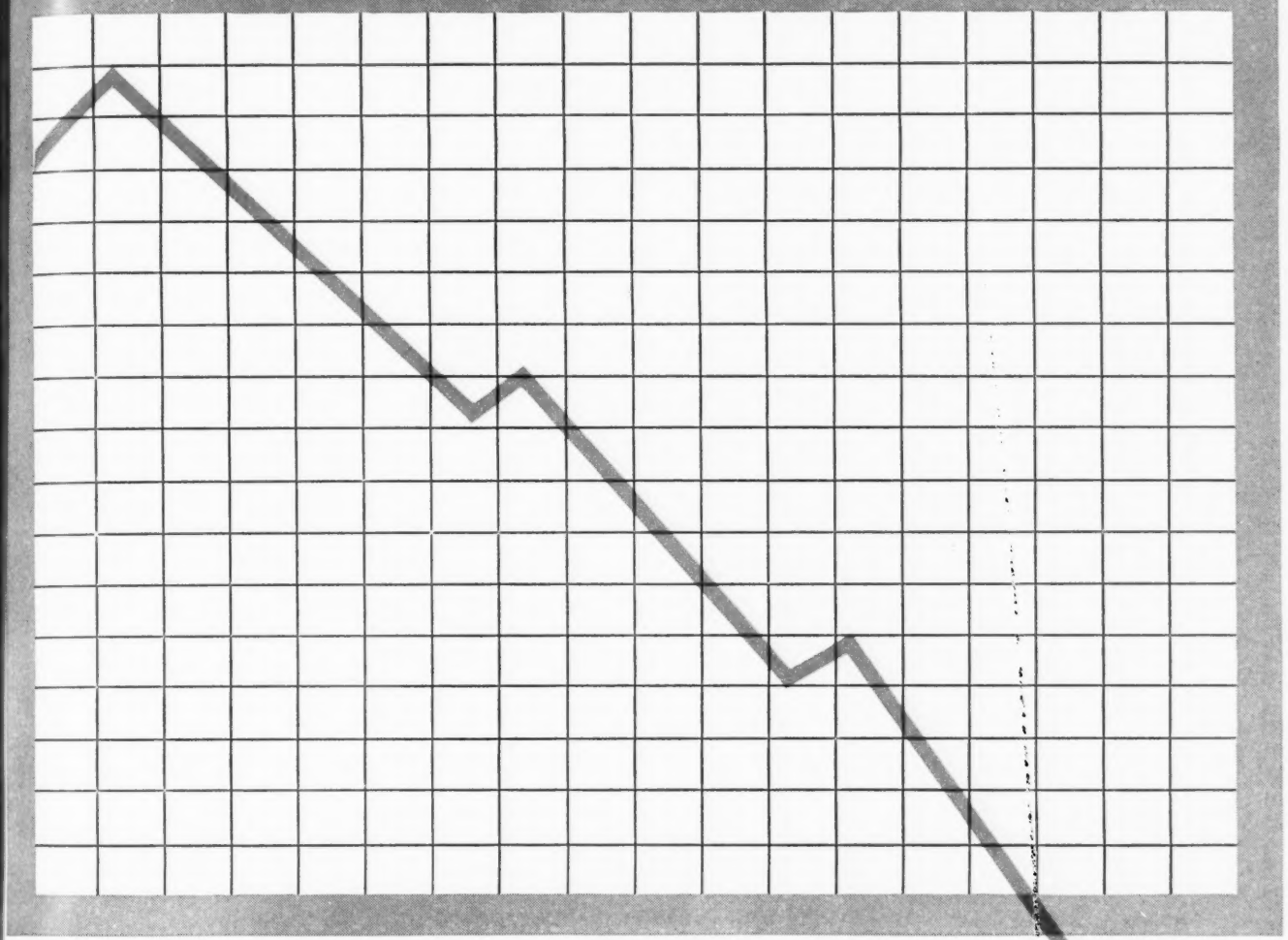
■

SEARCHLIGHT SECTION

Classified Advertising

EMPLOYMENT 196
BUSINESS OPPORTUNITIES 196
CORE BUILDING 197
Hoffman Bros. Drilling Co. 197
Pennsylvania Drilling Co. 197
SELLING OPPORTUNITIES 197
WANTED TO PURCHASE 197
USED AND SURPLUS EQUIPMENT 196-201
Allegheny River Mining Co. 200
All State Equipment Co., Inc. 198
Benny Equipment Co., R. H. 200
Bradford Supply Co., Inc. 199
Bryant, Leslie E. 201
Carlyle Rubber Co., Inc. 199
Cincinnati Machinery & Supply Co. 201
Coal Mine Equipment Sales Co. 197
Crawbuck Co., John D. 201
Dulien Steel Products, Inc. 197
Evans, O. C. 198
Electric Equipment Co. 200
Electric Service Co., Inc. 197
Duquesne Electric Mfg. Co. 201
Foster Co., L. B. 198, 199
Frank, M. K. 198
Greensburg Machine Co. 201
Greenspon's Son Pipe Corp., Jos. 199
Guyan Machinery Co. 200
Industrial Equipment Corp. 198
Iron & Steel Products, Inc. 198, 199, 201
Jones Mining Equipment Co. 200
Juliette Coal Co. 197
Kirk Co., Inc., Wallace E. 201
Moorhead Reitmeyer Co. 198
Morse Bros. Machinery Co. 200
Power Equipment Co. 201
Sherwood, E. C. 198
Stanhope Inc., R. C. 199
Tippins Machinery Co. 198
Toon, T. O. 197
United Pipe Supply Co. 199
Walsh Co., Richard P. 200
Weiss, B. M. 201
Winslow Scale Co. 200

WORKMAN ACCIDENT RECORD



JOE MUST HAVE SWITCHED TO *TRU·LAY PREFORMED WIRE ROPE!!*

(Yes — it's safer to handle)

AMERICAN CABLE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT

ESSENTIAL PRODUCTS...TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, MANLEY Auto Service Equipment, MARYLAND Bolts and Nuts, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Steel Castings, WRIGHT Hoists, Cranes . . . *In Business for Your Safety*

TODAY'S BLUEPRINTS

Hold Tomorrow's Answer to Greater Markets

COAL operators, during the past decade, are to be credited for their efforts in underground mechanization. This progressive move has placed many operations in position to stepup tonnage per manhour. Yet, in the face of competition, sheer quantity without the facilities for producing highest quality will not build markets nor hold them.

This means that the specific need for cleanliness, low ash content, close sizing, and uniform burning characteristics make highly modernized preparation facilities of greater urgency than ever before. Another factor in full modernization of preparation facilities is that of minimizing the loss of salable product to the refuse. Every additional per cent of coal recovered from reject increases total tonnage of clean coal, reducing the cost per ton.

In a highly competitive field such as is indicated for the post-war period, the extent to which methods are mechanized will naturally govern the margin between gross and net. Add to this the ever-present urgency of uniform quality around which extensive and profitable markets are built and you have a situation that requires immediate and careful analysis.

Sound planning now is all important. Coal will be faced with strong competition from other fuels. What goes into your blue-prints now will be the determining factor in your ability to compete ably. Link-Belt experienced engineers are available immediately to work with you in planning for modernized coal handling, sizing, cleaning, crushing, blending, and drying.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.

LINK-BELT

THE SYMBOL OF QUALITY — LINK-BELT COMPANY

CONVEYING . . . CLEANING . . .
COMPLETE PREPARATION EQUIPMENT

9617